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OF CRAFT BEER

//

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RESCUE OPERATION

//

ROOTS OF THE
FRENCH RESISTANCE

JUNE 2020 • SMITHSONIANMAG.COM

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You've got questions.
We've got experts.



TO OUR READERS

Like you, the journalists, artists and production whizzes who created this magazine have had their daily lives upended by the Covid-19 pandemic. We designed and edited these pages from our homes while working with dozens of scholars, illustrators, photographers and writers around the world, themselves housebound. It has been unsettling, to say the least. Yet we feel fortunate to launch *Smithsonian's* 51st year of publishing, and we are truly grateful for your support. Take good care. —The Editors

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“You really showcased the love and respect that Old Friends shows.”

Beatle Mania

As a young girl growing up in the D.C. area, I was a huge Beatles fan and George Harrison (“Meet the Beatle!” May 2020) was my favorite. I actually started a fan club for George. I somehow learned about Louise Harrison Caldwell and wrote her a letter and begged for “inside news” for our mimeographed monthly newsletter (cost: 25 cents). She wrote a lovely letter back in her formalized English script! It is among my most treasured items.

— **Melanie J. Biermann** | Free Union, Virginia

A Kentucky Home

My family and I had the privilege of visiting Old Friends (“When the Race Is Over,” May 2020). We got to meet several champions, including War Emblem. But the most special interaction came with Silver Charm. As our group was moving on from his pasture, I asked him if he’d like to take a selfie with me. As if he understood exactly what I had said, he trotted over and got in the picture. Jay Hovdey’s ar-

ticle really showcased the love and respect that Old Friends shows these magnificent animals.

— **Shannon Kederis** | Louisville, Kentucky

In a year full of severe criticism over American race-tracks, this article brought home the human side of responsibility and accountability. I hope it sparks others to establish pastures where these creatures can live out their remaining years in harmony and well-deserved comfort!

— **Carol Ahern** | Mashpee, Massachusetts

Barrier Breaker

As a 10-year-old routinely glued to televised Yankees games, I recall the umpire Emmett Ashford (“Behind the Mask,” May 2020) as a presence almost as memorable as Mantle and Maris. His distinctive, animated style stood out, and remains vivid half a century later. His enthusiasm for every call, every pitch, made the mundane balls and strikes, safe and out calls an event unto themselves. To hear his name mentioned as part of the day’s umpiring crew meant excitement was ahead. There’s little question that he endured much to reach the pinnacle of his profession.

— **Bernard Kavalier** | West Hartford, Connecticut

Aloha Spirit

I think you’ve forgotten one of the most famous aloha shirt fans (“Pacific Treasure,” May 2020): President Harry S. Truman. He loved to visit the “Little White House” in Key West, and while there his senior advisers often dressed down in aloha shirts too.

— **Richard Schroeder** | Washington, D.C.

I ate up your articles about aloha shirts, Andy Warhol, Old Friends horse sanctuary, winning photographs and George Harrison’s trip to Illinois. Well done! Keep these arts and culture stories coming.

— **Christena Alcorn** | Austin, Texas

Correction: The answer key for our crossword puzzle, “Staying Put” (May 2020), reversed two letters. “Monogram for a Supreme Court justice” should be “RBG” and “Math course with identity proofs” should be “TRIG.”

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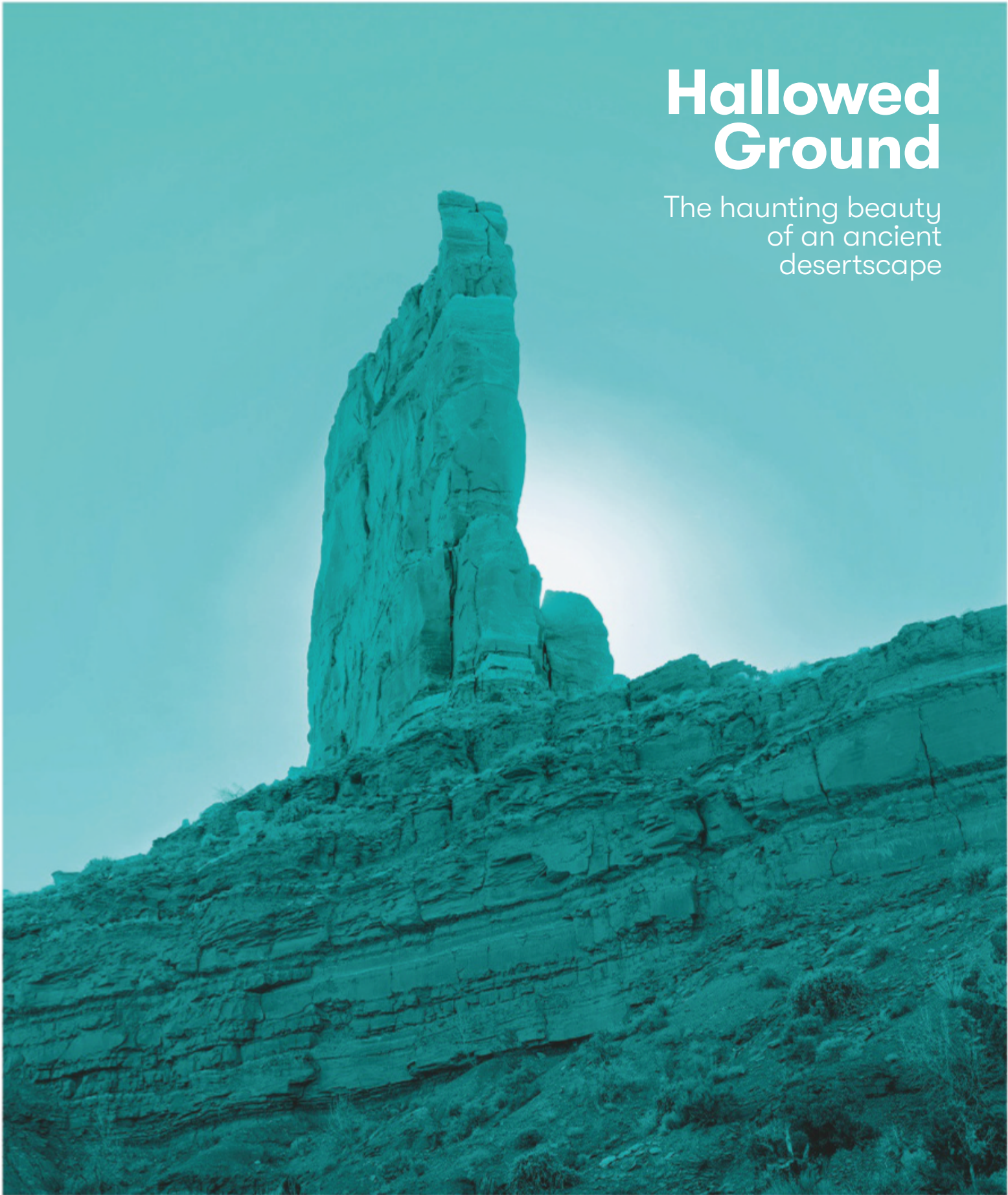
THE PAST IS

prologue

By
Rahawa Haile

Photograph by
David Benjamin Sherry

AMERICAN ICON



Hallowed Ground

The haunting beauty
of an ancient
desertscape

▲ In the Valley of the Gods, spires and buttes reveal 250 million years of geological time.

T

O THE WEST OF BLUFF, UTAH, in the state's southeast corner, an unassuming 17-mile gravel road branches off from U.S. Route 163. The path cuts an arc through cultural and geological riches aptly named the Valley of the Gods, where red-rock formations tower hundreds of feet in the air, sculpted by the earth's most reliable architects, wind and water.

Buttes and soaring pinnacles are shaded orange and red from the oxidized iron within, their Cedar Mesa sandstone dating back over 250 million years. Line after horizontal line, the years unfold vertically, the striations of time shimmering in the heat like a Magic Eye puzzle. The arid plain is dotted with blooming yucca in the spring, sage and rabbit brush, Indian paintbrush and other wildflowers. Life endures in the cracks of the world as it always has, in caves and trunk hollows. The San Juan River, lifeblood of the Four Corners area, lies to the south, carving gorges as it surges westward to meet the Colorado River.

It is no wonder the Valley of the Gods is sacred to the Navajo, whose mythology holds that these grand spires contain the spirits of Navajo warriors. Indeed, the greater Bears Ears area around the Valley contains more than 100,000 sites of cultural significance to Native Americans, including the creation mythologies of tribes such as the Ute and Navajo, for whom Bears Ears is akin to their Garden of Eden. The area serves as a history book written in fossils and artifacts, in the bones of indigenous ancestors and the plants that healed and fed them. In 2008, the federal government acknowledged this extraordinary legacy by protecting the Valley of the Gods, designating it an Area of Critical Environmental



The Valley of the Gods offers one of the most solitary and serene experiences in the American West.

“**THEIR MYTHOLOGY HOLDS THAT THESE GRAND SPIRES CONTAIN THE SPIRITS OF NAVAJO WARRIORS.**”

Concern for its “scenic value.” Then, in December 2016, during his final full month in office, President Obama designated the Bears Ears area, including the Valley of the Gods, as a national monument. Among other things, the move recognized the land's importance to native tribes, and came after decades during which the health of those tribes suffered profoundly from nearby uranium mines and the resulting groundwater poisoning—not to mention high rates of lung cancer and disease among native miners.

Then, in 2017, President Trump shrank Bears Ears National Monument by 85 percent and Grand Staircase-Escalante National Monument, another protected area in southern Utah, by almost 47 percent. The change, the largest single reduction in federal land protections in U.S. history, was in response to what the administration characterized as overreach by former presidents. But the *Washington Post* reported that a uranium-mining firm had actively lobbied the administration to reduce Bears Ears, and the *New York Times* found that lobbyists had been indicating which parcels of land the companies wanted to be opened to industry.

Shortly after the reduction, companies leased over 50,000 acres from the Bureau of Land Management for oil and gas extraction east of the former borders of Bears Ears National Monument. This February, the Department of the Interior finalized its plan to make much of the for-

mer monument available not only to cattle grazing, but to mining interests as well.

For now, the Valley of the Gods itself is off limits to development and mining interests; it still enjoys protections based on the 2008 designation, even though the shrunken Bears Ears National Monument no longer includes it. Another thing in its favor is obscurity. Visitors to the region are far more inclined to visit the larger and more popular Monument Valley, the backdrop of countless Hollywood westerns, which is about 30 miles away on sovereign Navajo land. Thus the Valley retains something truly rare: wilderness, in its utmost sense.

The 1964 Wilderness Act defined wilderness as “an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain.” Those who are drawn to the Valley of the Gods’ solitude and spires may explore its roughly 32,000 acres without the likelihood of encountering another person. Camping is permitted but only at established sites. Everything one needs to survive must be packed in and out. As a reward for self-sufficiency, one gets the brilliance of the night sky on a new moon—the serenity of the darkness without the crowds who overrun so many of Utah’s breathtaking wilds.

Edward Abbey, the 20th century’s famed cantankerous chronicler of the Southwest, wrote about the Valley of the Gods in *The Monkey Wrench Gang*, his adventurous novel about ecological saboteurs fighting against the development and exploitation of the region’s natural resources. “Ahead a group of monoliths loomed against the sky, eroded remnants of naked rock with the profiles of Egyptian deities,” Abbey wrote of the Valley. “Beyond stood the red wall of the plateau, rising fifteen hundred feet above the desert in straight, unscaled, perhaps unscalable cliffs.”

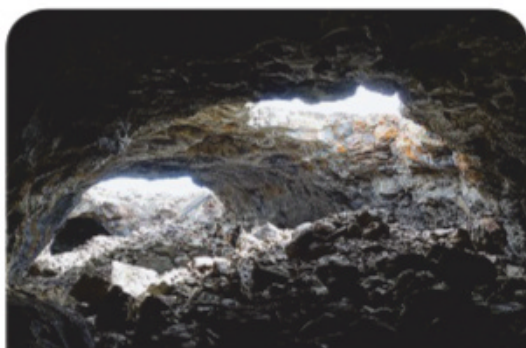
Were Abbey alive today, he would likely be thrilled to find the landscape that he knew: no trails, no services, no fees, no permit, no visitor center—a place, not a park, whose precious, eons-old wilderness survives, for the moment, intact. ♦

Landmark Decisions

IT’S A PRIVILEGE THAT COMES WITH THE WHITE HOUSE. BUT PRESERVING U.S. PROPERTY FOR HISTORY’S SAKE IS NO WALK IN THE PARK

By Anna Diamond

SINCE 1906, presidents have used the Antiquities Act to designate 158 national monuments, covering over 700 million acres, to safeguard their natural or social history. That power has sparked disputes about federal overreach, and lands set aside by one president can always be changed by another—or by Congress.



1924 CRATERS OF THE MOON NATIONAL MONUMENT, IDAHO: Calvin Coolidge preserved this otherworldly site, formed by volcanic activity, at nearly 25,000 acres. Four presidents went on to shrink or enlarge it—most recently, Bill Clinton expanded it to over 750,000 acres.



1943 JACKSON HOLE NATIONAL MONUMENT, WYOMING: FDR’s protection of forests and lakes led to a legal clash with locals who opposed it as a land-grab. Congress reversed the designation; FDR vetoed the reversal. In 1950, the monument joined Grand Teton National Park.



1978 MISTY FJORDS NATIONAL MONUMENT, ALASKA: These fjords, shaped by glaciers and surrounded by sea cliffs thousands of feet tall, mark one of the 15 sites, covering 56 million acres, that Jimmy Carter named as national monuments in the state during his one term as president.



1996 GRAND STAIRCASE-ESCALANTE NATIONAL MONUMENT, UTAH: Bill Clinton preserved this marvel of canyons, monoliths, arches and bridges, foiling plans for a coal mine. A 1998 federal law altered the monument’s borders; in 2017 Donald Trump shrank it by nearly 47%.



2006 AFRICAN BURIAL GROUND NATIONAL MONUMENT, NEW YORK: George W. Bush commemorated this site, the oldest known burial place for enslaved and free Africans in the country, in use from the 1630s to the 1790s. The area is estimated to contain over 15,000 skeletons.



2012 CÉSAR E. CHÁVEZ NATIONAL MONUMENT, CALIFORNIA: Barack Obama created national monuments at several sites where civil rights movements were organized; first was the headquarters of the United Farm Workers union and the former home of its iconic organizer.

UPDATING AMERICA

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A **MODERNIST MASTER** and black history's pre-eminent visual storyteller, Jacob Lawrence completed his most famous set of paintings in 1941, when he was just 23. A sweeping view of African-Americans' mass exodus from the Jim Crow South—laid out over 60 color-saturated tempera panels—his "Migration Series" is still considered one of the major achievements in 20th-century American art.

But another series by Lawrence, equally ambitious in scope and radical in vision, had been largely forgotten until this year, when the Peabody Essex Museum, in Salem, Massachusetts, organized a new traveling exhibition, scheduled next for New York's Metropolitan Museum of Art. It is the first showing in more than 60 years of Lawrence's "Struggle: From the History of the American People."

These 30 hardboard panels, each 12 by 16 inches, cover the period from the American Revolution until 1817. Lawrence, often looking through the eyes of marginalized characters, takes on storied events such as the Boston Tea Party, as well as less celebrated episodes,

Twenty-three-year-old Jacob Lawrence in 1941, the year he completed his acclaimed "Migration Series."



including slave rebellions and the long war on Native Americans. But despite the seemingly universal appeal of his subject matter in a country long enamored of its own history, when Lawrence completed the project in 1956 "Struggle" inspired little enthusiasm among buyers.

"He was at the height of his powers—teaching at Pratt, exhibiting—so the reception was interesting," says Peabody Essex curator Lydia Gordon. "I think the general public didn't know what to do with it. He'd gone beyond the boundary of how he was defined and understood, as a black artist depicting black history."

Over the decades, the "Struggle" panels were dispersed among private collectors. Reassembling them took years of detective work—and luck. (Panel 19 resurfaced at an auction when the museum was readying the show.) And while five panels remain missing, curators hope the exhibition might inspire their owners to come forward.

The series tells a compelling story about the messy work of building a democracy—and the people, especially women, blacks and Native Americans, left out of historical narratives. "We have become the country we are because of conflict," Lawrence said in 1992 (he died in 2000), "and I always say that conflict can be very beautiful in what comes out of it." ♦

Panel 21 from "Struggle" depicts the Battle of Tippecanoe, when U.S. forces defeated Shawnee Chief Tecumseh and his British allies in 1811.





Paul Rivet addresses a congress of the French Socialist Party on July 2, 1948.

Defying the Nazis

For years Paul Rivet opposed the ideology fueling Hitler's rise. Then he helped French fighters take the battle underground

W

HEN NAZI TANKS rolled into Paris in the early morning of June 14, 1940, most Parisians had already left the city in a mass exodus to the south. All the museums were closed except the Musée de l'Homme, or Museum of Mankind, which tacked a freshly placed French translation

of Rudyard Kipling's poem "If" to its doors: *If you can keep your head when all about you are losing theirs . . . you'll be a Man, my son!* It was a defiant gesture, a dangerous message and even a sly call to arms: Unbenown to the invading army, the man behind the sign, the museum's director, would become a moving force in the nation's secret counteroffensive network. ➔

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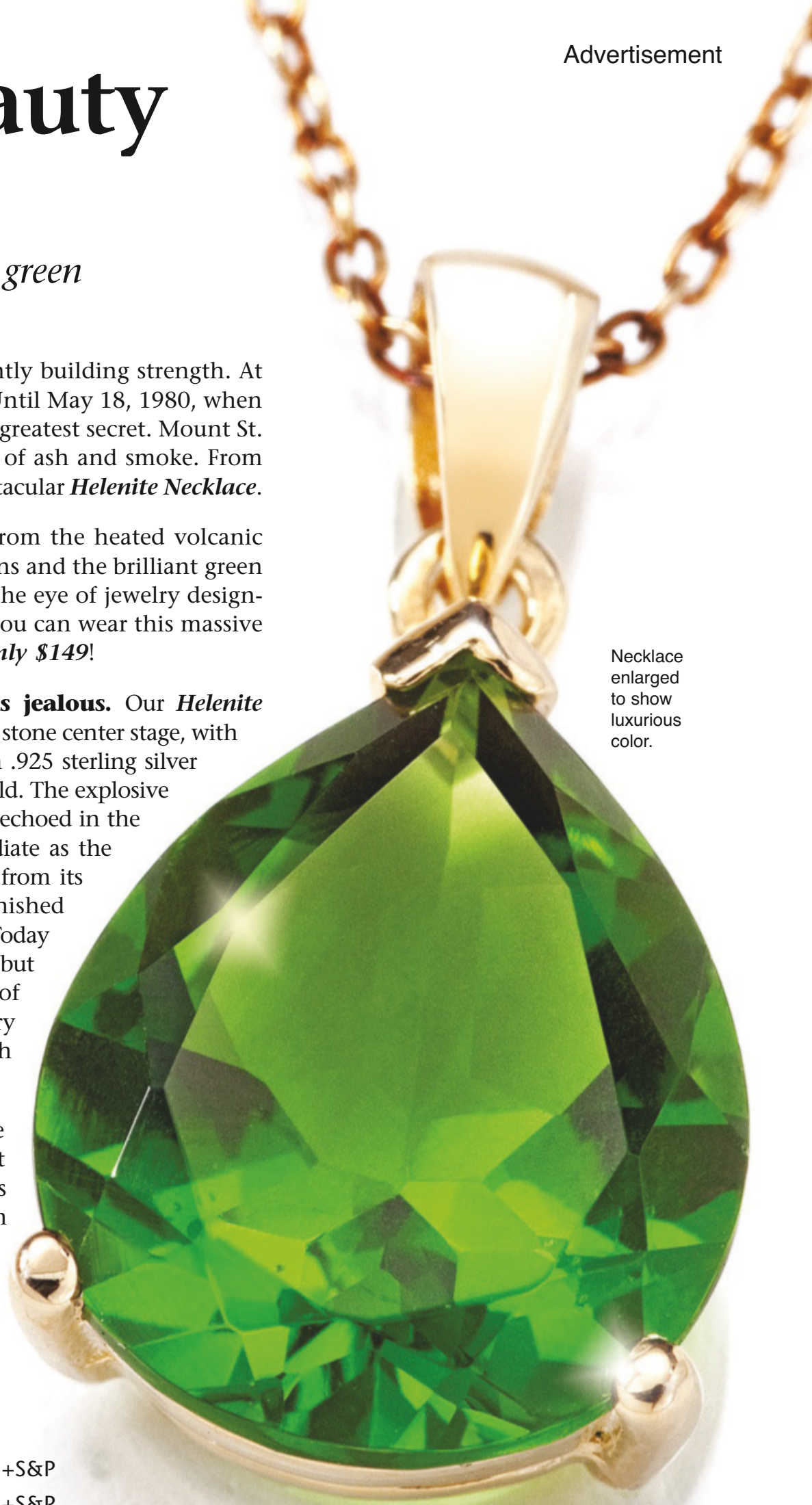
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Stauer Client

With his bald pate, round eyeglasses and winged collar, Paul Rivet, an anthropologist then in his 60s, may seem an unlikely hero. Yet a recent wave of scholarship has revealed the true extent of his bravery and ingenuity in helping undermine not only the Nazis but also their French collaborators. This work, significantly, grew out of his long academic career, in which he boldly criticized racist ideas promoted by many anthropologists (and adopted by the Nazis). But by the summer of 1940, his fight was no longer an intellectual exercise. Rivet and his band of museum protégés—young scholars who didn’t hesitate to take up arms and risk their lives—went on to organize one of the earliest groups in the French underground. It was this group, in fact, that helped to give the movement a name: the Resistance.

The story of the Musée de l’Homme group would end tragically, in betrayal, but historians agree that it showed the French people, many of whom were at first resigned to the occupation, that it was possible to oppose the Nazis—in spirit but also in action, by stealing their military plans, helping their prisoners escape and generally frustrating them. The Musée de l’Homme group “fed and watered the Resistance to come,” Julien Blanc, a historian, wrote in the first detailed study of that group, published in French in 2010.

A physician by training, Rivet became interested in anthropology in 1901, when he joined a five-year scientific expedition to Ecuador to measure the curvature of the Earth. While acting as the group’s official doctor, Rivet became intrigued by the linguistic and cultural diversity of the Amerindian peoples he encountered and began to study them.

Anthropology at that time divided humanity into “races,” largely on the basis of measuring skeletons—particularly skulls. Like most of his peers, Rivet accepted that races existed and that they were biologically distinguishable from each other, but he strongly rejected the concept of a racial hierarchy, in which some races were regarded as superior to others. He believed that people of different races were also products of long adaptations to their unique physical, social and cultural

“**THOSE TWO CORPSES HAUNT ME LIKE AN OBSESSION.**”

environments. After he returned to Paris from Ecuador, Rivet and like-minded colleagues reoriented French anthropology along those lines, to consider races as different but equal.

During the First World War, Rivet served as a medical officer at the First Battle of the Marne in 1914 and later in Serbia, and received medals for bravery, including the Croix de Guerre, for his unit’s role in setting up medical services behind the front lines. A decade later, he took over the old

Museum of Ethnography on the Chaillot Hill, with its panoramic view of the Seine and the Eiffel Tower on the opposite bank, and set about modernizing it. As German anthropology embraced a notion of an Aryan super race, and anti-Semitic elements in French academic circles followed suit, Rivet co-founded an antiracist journal, *Races et Racisme*, in 1937.

The building that housed the old Museum of Ethnography was razed, a new building went up on the same site, and Rivet moved his renamed and modernized Musée de l’Homme into it. Here, a visitor still encountered the skulls and skeletons of different races for comparison, but now she also strolled through galleries organized by region, in which each region’s indigenous population was presented with its tools, art and symbols. Overall, the emphasis was on the similarities between peoples, rather than the differences.

As Hitler’s menace loomed over Europe, Rivet inaugurated the new Musée de l’Homme before an audience of France’s artistic, intellectual and political elite. By way of explaining the museum’s name, Rivet would later say: “Humanity is one indivisible whole throughout space and time.”

HIS MESSAGE WAS AS political as it was scientific. Unlike many of his contemporaries—indeed, unlike many scientists today—Rivet had always considered politics and science to be inseparable, having seen how “scientific” notions of supremacy could lead to violent injustice. He had been an outspoken critic of the anti-Semitism that led to the conviction of French artillery officer Alfred Dreyfus for treason in 1894, and was a prominent member of France’s antifascist movement in the 1930s. Visiting Berlin in 1933, he was shocked to find how deeply Nazi ideology had penetrated German society. In a letter to a close colleague, the German-American anthropologist Franz Boas, who had performed curatorial work for the Smithsonian Institution, he wrote that “a real regime of terror is reigning in Germany and this regime seems to cause no reaction at all” among many Germans.

Rivet started recruiting exiled German Jews and Eastern Europeans to give them a haven in which to work. According to his biographer, Christine Laurière, he also wanted to increase the representation of Eastern European cultures at the museum, viewing them as a bulwark against fascism. Among his recruits were 26-year-old Boris Vildé, a Russian-born linguist and ethnologist who specialized in the Finno-Ugric peoples of northeastern Europe, and 30-year-old Anatole Lewitsky, a tall, aristocratic-born Russian who had studied shamanism in Siberia, and whom Rivet discovered





◀ The Musée de l'Homme in Paris after an extensive 2015 renovation.

driving a Parisian taxi. They haunted the museum's basement, which housed the scientific research departments, addressing Rivet as *cher Docteur*.

When war broke out, Vildé and Lewitsky—by now naturalized French citizens—were called up for military service. Injured and captured by the Germans, Vildé was interned in a prison camp in the Jura Mountains, between France and Switzerland, from which he managed to escape. Rivet later recalled his reappearance at the museum, on July 5, 1940: “We were sharing a frugal meal, right here, when our friend appeared, leaning on a cane, thin, exhausted. Without a word he sat down among us; he had returned to the bosom of his spiritual family.” Lewitsky also returned that summer, having escaped German captivity.

Vildé, Lewitsky and Yvonne Oddon, the museum librarian and Lewitsky's lover, now launched a campaign of organized disobedience against the

invaders—and against the collaborationist French government. With Vildé leading the cell, they recruited friends and colleagues across Paris, and within a few months “the little group had transformed itself into a veritable spider's web covering the whole of France,” writes Tatiana Benfoughal, Vildé's biographer. Rivet, too well-known to take an active role, facilitated everything they did: He put them in touch with Parisian intellectuals who he believed would be sympathetic to their cause, he translated speeches by Churchill and Roosevelt for them, and above all he provided them with a base and logistical support in the form of the museum, which he vowed at the outbreak of war to keep open. Vildé, under cover of his work for the museum, traveled through the occupied and free zones of France, recruiting dissidents, gathering military intelligence and organizing escape routes for Allied prisoners of war held in Nazi-run camps—by boat from the fishing ports of Brittany, for example. At one point he claimed he could draw on a 12,000-strong force and an impressive stockpile of arms. It was undoubtedly an exaggeration, but he understood the

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**HUMANITY IS ONE INDIVISIBLE
WHOLE THROUGH SPACE AND TIME.**
”

power of words as well as Joseph Goebbels, Hitler's propaganda minister.

With Rivet's blessing, the group used a mimeograph machine in the basement to produce a clandestine newspaper, *Résistance*. Oddon proposed the name, recalling that in the 18th century, Huguenot women imprisoned for their Protestantism carved *RESISTER* into the stones of their prison. An editorial from the first issue, dated December 15, 1940, proclaimed: “Resistance! That's the cry that goes up from your hearts, in your distress at the disaster that has befallen our nation.” Copies were distributed around the city. It was dangerous work—if caught by the Gestapo, the *résistants* risked being tortured and executed—so they inhabited a secretive, nocturnal world of code names and passwords. When one of them wanted to speak to Oddon about resistance matters, they would appear in the library and announce: “I have come for my English lesson.” Rivet carried on the fight in public, giving hugely popular, standing-room-only lectures on the folly of scientific racism. In July 1940 he wrote the first of three open letters to France's collaborationist

SEE VIDEO FOOTAGE of the Nazi occupation of Paris at [Smithsonianmag.com/rivet](https://www.smithsonianmag.com/rivet)



A Mosquito from the RAF's 105 Squadron, used on several low-altitude daylight bombing operations during 1943.

Buzz Kill

THE THUNDERING RAF MISSION
THAT STIFLED THE NAZIS

By **Cory Graff**

GERMANY'S LEADERS decreed January 30, 1943—the ten-year anniversary of Adolf Hitler's rise to power—as a day of celebration. Berlin would host rallies, and Reich Marshal Hermann Goering's address from the Air Ministry building would be broadcast throughout the Third Reich.

Elements of Britain's Royal Air Force would also be in attendance: In an attack unlike any before or since, the British sought to silence Nazi leadership with a loud aerial intrusion designed to humiliate. Under gray skies, a trio of speeding de Havilland Mosquito bombers from No. 105 Squadron entered Berlin's airspace at precisely 11 a.m.—the moment Goering was scheduled to begin speaking.

When the bombs and the British engines intruded on the broadcast of Goering's speech, radio engineers cut his feed and scrambled for safety. A bewildered German public instead heard the cacophony of bombers, which was soon replaced on their radios with a crackly recording of marching band music. It was more than an hour before a furious Goering returned to the airwaves.

Hours later, Minister of Propaganda Joseph Goebbels hailed the Nazi faithful at Berlin's largest indoor sports venue, his address also set for broadcast. Three more Mosquitos, this time from the RAF's No. 139 Squadron, appeared on cue. Still, Goebbels continued his speech, and this time the anxious audio engineers stayed with the broadcast.

Though one Mosquito went down under fire, the United Press lauded the success of the "daring raid" that proved the Allies could hit practically anywhere at any time. ♦

leader, Marshal Philippe Pétain, in which he warned, "Marshal, the country is not with you."

In November 1940, he learned from the radio that the Vichy government had stripped him of his museum post; three months later, tipped off that the Gestapo was coming for him, he fled to Colombia. Just hours later, the Gestapo searched the museum in vain for plans of the German U-boat base at Saint-Nazaire on the Brittany coast—plans that Vildé's people had stolen. The plans reached the British, and their forces bombed the base in 1942. In

Bogotá, Rivet headed up the local committee of Gen. Charles de Gaulle's government in exile, providing intelligence, contacts and logistical support to comrades in the Resistance back home.

The Gestapo arrested Vildé on March 26, 1941, after he was betrayed by two other Russian émigrés working at the museum, whom Rivet had recruited, and by a French double agent. Either the Gestapo or the Abwehr—a German intelligence organization—rounded up his fellow *résistants* around the same time. After they'd spent almost a year in prison, a German military tribunal found them guilty. Despite petitions from influential French figures including the poet Paul Valéry and the exiled Rivet, a firing squad executed Vildé, Lewitsky and five others at Fort Mont-Valérien, a fortress outside Paris, in February 1942. The tribunal commuted Oddon's sentence, and she spent time in various prisons before being deported to the Ravensbrück concentration camp in Germany in late 1944.

Laurière, Rivet's biographer, has unearthed just one letter that Rivet wrote to a friend at the time. It acknowledged the fate of Vildé and Lewitsky: "Those two corpses haunt me like an obsession."

Another young ethnologist, Germaine Tillion, took over Vildé's role as the head of the museum's resistance cell. She too was betrayed and deported to Ravensbrück. Both Tillion and Oddon survived the camp, and Tillion would publish a groundbreaking ethnographic study based on her captivity, *Ravensbrück*.

Rivet returned from exile in October 1944 following the liberation of Paris; de Gaulle awarded him the Resistance medal in recognition of "the remarkable acts of faith and of courage that, in France, in the empire and abroad, have contributed to the resistance of the French people against the enemy and against its accomplices." Oddon, Tillion, Vildé and Lewitsky were awarded the same medal—the last two posthumously. Rivet resumed his old post at the museum.

Today, the lobby at the Musée de l'Homme hosts a small permanent exhibition dedicated to Rivet, Vildé, Tillion and their band. If you climb the stairs and turn right, you look out through a large window onto the Eiffel Tower, from which a swastika once flew. Turn left, and you arrive at the research library named for Yvonne Oddon, where the *résistants* came for their English lessons. ♦

By
Emily Moon

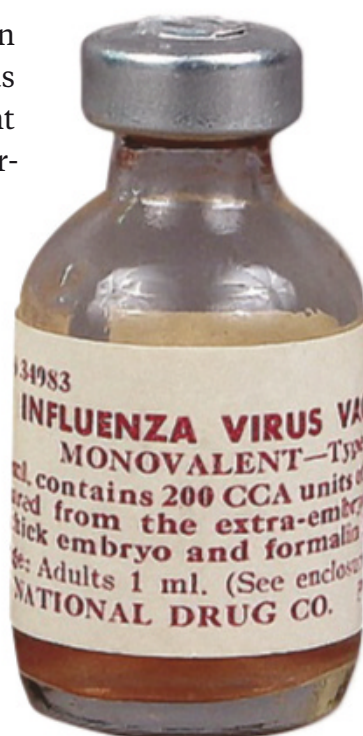
PREDICTING THE PANDEMIC

How a medical researcher protected millions of Americans from a new contagion

IN APRIL 1957, a new strain of a lethal respiratory virus emerged in East Asia, caught local health authorities by surprise and eventually killed masses of people worldwide. Today, in the age of Covid-19, that scenario sounds frighteningly familiar—with one key difference. Maurice Hilleman, an American microbiologist then running influenza monitoring efforts at the Walter Reed Army Institute of Research, saw the problem coming and prepared the United States ahead of time. “This is the pandemic,” he recalled saying. “It’s here.”

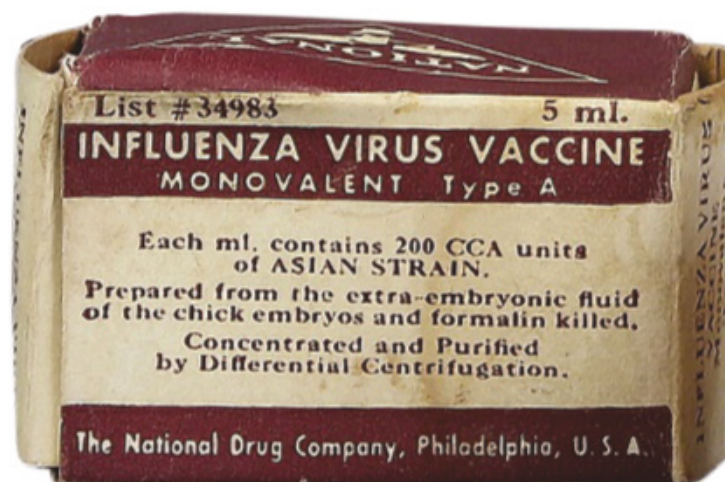
Hilleman arranged for the U.S. military to ship samples of the pathogen, believed to be a novel influenza virus, from Hong Kong to his lab in Washington, D.C. For five days and nights, his team tested it against blood from thousands of Americans. They found that this strain, H2N2, was unlike any flu that humans were known to have encountered. When it reached the United States, no one would be immune.

Hilleman moved quickly to alert the government, even predicting when the virus would hit U.S. shores: the first week of September, right when schools would reopen. In the years since the 1918 pandemic, health officials had lost sight of the deadly power of aggressive strains of influenza viruses, and the U.S. Public Health Service ignored Hilleman’s warnings. “I was declared crazy,” Hilleman told the pediatrician Paul Offit, who reports the conversation in his book *Vaccinated*. Still, having identified the new strain, Hilleman sent samples of the virus to the six biggest pharmaceutical companies, directing them to produce a vaccine for this new flu—and they did, partly out of respect for Hilleman himself. “He had that sort of clout” within the industry, says George Dehner, a historian.



The pandemic of 1957-58 ultimately caused 1.1 million deaths worldwide, and it follows the 1918 crisis as the second-most severe influenza outbreak in U.S. history. Some 20 million Americans were infected, and 116,000 died. Yet researchers estimate that a million more Americans would have died if not for the pharmaceutical companies that distributed 40 million doses of Hilleman’s vaccine that fall, inoculating about 30 million people. His swift and perceptive response to the virus led one expert to predict, according to the *New York Times*, that Americans could look forward “to the time when common virus diseases will be preventable and treatable and even curable.”

Hilleman went on to join Merck & Co., where he developed vaccines for more than 40 diseases, including measles, mumps and meningitis. But as these illnesses faded from public memory, so did Hilleman, who died in 2005 at age 85. Alexandra Lord, chair and curator of medicine and science at the National Museum of American History, says one irony of public health is that “the more successful experts are, the more people forget about the dangers.” ♦



Vial and (below) packaging for the 1957 H2N2 vaccine, at the National Museum of American History. Producing the inoculation required hundreds of thousands of fertilized chicken eggs per day.

Birdman's Latest Trick

Skateboard legend Tony Hawk has done the impossible again—he has brought the maverick sport into the mainstream

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LEVEN YEARS OLD, towheaded and built like a starving stork, the most famous skateboarder in the world began skating in earnest in 1979 during a trip to Oasis Skatepark, near his hometown of San Diego. There, Tony Hawk saw kids as small as he was rolling and carving through a

sea of concrete waves in the shadow of Interstate 805. Over in the skate bowls, he recalls, kids were “flying.” Inspired, Hawk stepped on the board, rolled up a wall, took to the air and basically never came down.

Today, the 1975 Bahne skateboard on which he learned to ride tells the story of a single man’s extraordinary career but also the vexed, tumultuous





By
Cole Louison

Photograph by
Tom Fowlks

“
**IN ITS EARLY DAYS, SKATEBOARDING
WAS CONSIDERED A SPORT FOR
MISFITS AND OUTSIDERS.**
”

60-year history of a much-misunderstood sport.

The first wave of skateboarding—when decks were wood, wheels were steel and “sidewalk surfing” was banned in 20 U.S. cities by August 1965—had ended by the time Hawk stepped on the board. Yet the sport enjoyed a major resurgence in the 1970s, thanks in part to new technology. The blue Bahne evokes an era when public outcry had driven skaters off sidewalks and into the first skateparks, where they rode plastic boards with polyurethane wheels higher and higher up the walls of in-ground pools that were capped at the top or extended with plywood.

Hawk went pro at 14 and would prove a magnetic, inventive figurehead for skateboarding throughout the 1980s, when wooden ramps replaced parks and fish-shaped boards of layered hardwood heralded

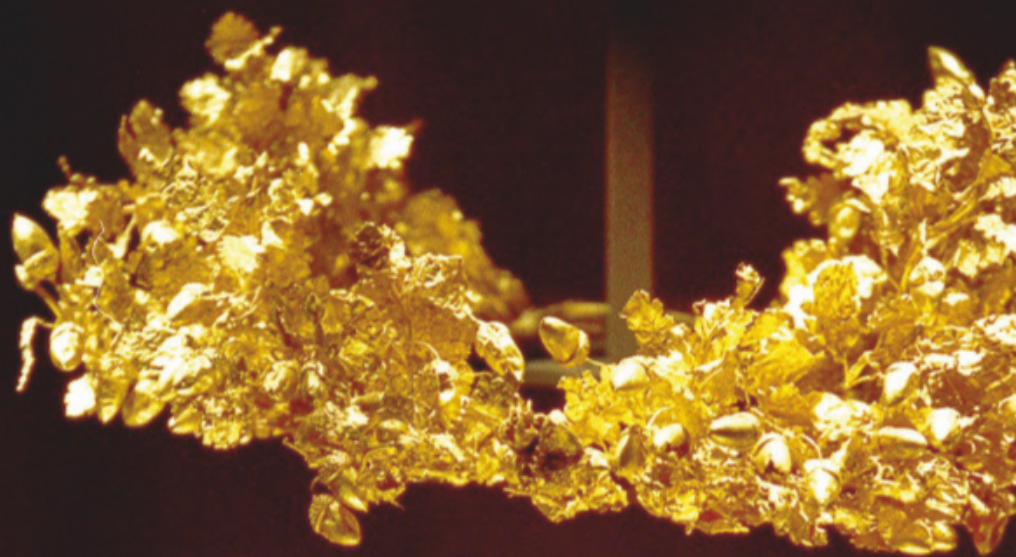
an era of high-flying and tech-savvy skateboarding.

It was Rodney Mullen, Hawk’s teammate on the famed Bones Brigade, who invented the flat-ground ollie, a jumping maneuver, in which riders kick the tail down to bring the board off the ground and into the air—where anything is possible. Hawk was achieving a similar effect on ramps, flying high above the ramp’s lip, where he learned to spin 360 degrees, then 540 degrees, and then, in 1985, in Stockholm, 720 degrees—two aerial rotations, a feat virtually unimaginable at the time.

In the late 1980s, public tolerance for the sport returned to something like loathing, and skateboarding saw another fall from grace. Ramps were shuttered as the number of boarders plummeted. Hawk was a new father when the bottom fell out this time, as sales dwindled for his

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FROM THE
SMITHSONIAN
NATIONAL
MUSEUM OF
AMERICAN
HISTORY



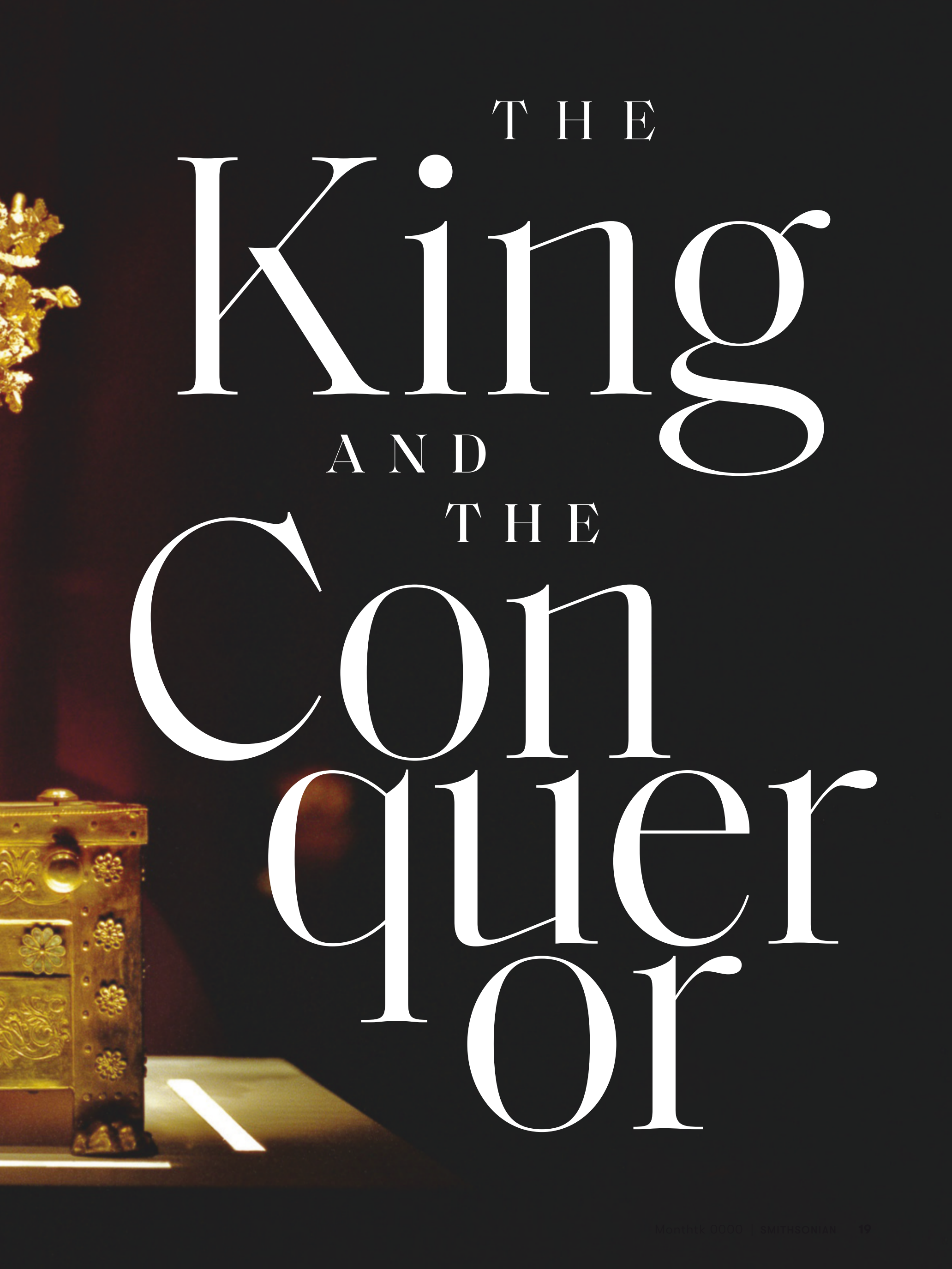
Alexander the Great's unmatched military prowess and far-flung empire changed the world. But archaeologists in Greece are showing how his murdered father, **Philip of Macedon**, led the way

by RICHARD GRANT

photographs by MYRTO PAPADOPOULOS



Treasures in Philip's tomb: a golden larnax that held his ashes and his wreath, partially melted in the pyre.



THE
King
AND
THE
Conqueror



I **DRIVE ON A DIRT ROAD** in Northern Greece through the ruins and spectral presence of a once-great city. Behind it, cloud shadows move across steep, forested mountains. Small birds dart from bushes. Wind combs the grass. Chunks of limestone, quarried more than 23 centuries ago, protrude from the earth. In the passenger seat, talking and gesticulating, is an archaeologist named Angeliki Kottaridi, a slight, forceful woman in her early 60s with bright coppery-dyed hair.

She is the director of operations here at Aigai, the ancient royal capital of Macedonia, now protected by Unesco as one of the most important archaeological sites in Europe. This is where Philip II of Macedon, having conquered nearly all of classical Greece, built his monumental palace in the fourth century B.C. For too long, Philip has been regarded as a minor figure in ancient history, remembered primarily as the father of Alexander the Great. But Philip was a colossus in his own right, a brilliant military leader and politician who transformed Macedonia and built its first empire. At Aigai, it is Philip who looms largest among the ruins, even though the place was vitally important for Alexander too. Excavations have revealed that Philip transformed the ancient city, revolutionized its political culture, and turned it into a symbol of power and ambition.

We pass the worn-down remains of the outdoor theater that Philip built near his palace. This is where he entertained dignitaries from across Greece and the Balkans, and where he ultimately met his death in a shocking public assassination. Kottaridi hopes to start excavating and restoring the theater soon, but this is an extremely busy year at Aigai. She and her team are preparing the exhibits for a massive new museum, scheduled to open to the public in January 2021. It will showcase artifacts found at the site—a selection of more than 6,000 items, spanning 13 centuries. Meanwhile, digging continues in the vast burial grounds and other parts of the city, and a staff of 75 is working to complete a \$22 million partial restoration of Philip II's palace—the largest building in classical Greece, three times the size of the Parthenon in Athens. For Kottaridi,



Philip, who was legendary for his courage in battle, wears a lionskin headdress in an illustration from the 1800s. Ancient Macedonians prized the big-cat hunt and regarded a lion pelt as a symbol of fearlessness.

Archaeologist Angelika Kottaridi, with her rescue dog in the ruins of Philip's vast complex, likes to underscore its magnificence: "The main peristyle of the palace is three times bigger than the Parthenon in Athens."



decades of work are coming to fruition, and for anyone interested in Philip and Alexander, Aigai is now a must-see destination.

And yet there is so much more to learn. “We have excavated only a tiny portion of the site, less than 1 percent, and this has taken decades,” says Kottaridi. “We are constantly making new discoveries, so many that it’s a problem, because we must also preserve what we have, restore the most important structures, write everything up and present our discoveries to the public. There is enough work for three or four lifetimes.”

Kottaridi grew up in the northern Greek city of Thessaloniki and studied at the Aristotle University there. Now she lives near Aigai in a house that she shares with a rescue dog and a retinue of 30

tunity. And it all began right here in Aigai.”

This is where Alexander launched his famous invasion of the Persian Empire. Without denying Alexander’s greatness, it’s important to remember that he was using his father’s army, and that the expedition was Philip’s idea.



KOTTARIDI AND HER COLLEAGUES have found graves and ornamental burial goods dating back perhaps 3,000 years, but Aigai didn’t become a city until the seventh century B.C. That’s when the Temenids, a Macedonian royal dynasty that claimed direct descent from Zeus and Hercules, established their capital here.

According to legend, the first Temenid king, Perdiccas, was told by the oracle at Delphi that a herd of white goats would lead him to the site of his kingdom’s capital. Perdiccas followed the goats to the

foothills of the Pierian Mountains, overlooking the Haliacmon River as it crosses the wide green Macedonian plain. “The word *aigai* means ‘goats’ in ancient Greek,” says Kottaridi, as we admire the same view.

The culture of the ancient Macedonian people, who originated as herding and hunting tribes north of Mount Olympus, became more Greek under Temenid rule. They spoke a dialect of the Greek language and worshiped Greek gods. “One of the important discoveries at Aigai was the tombstone carv-

ings,” says Kottaridi. “They taught us that everyone here had Greek names. They thought of themselves as Macedonians and Greeks.”

In the eyes of sophisticated Athenians, however, they were northern barbarians who mangled the language, practiced polygamy, guzzled their wine without diluting it, and were more likely to brawl at the symposium than to discuss the finer points of art and philosophy. The Athenian politician Demosthenes once described Philip II as “a miserable Macedonian, from a land from which previously you could not even buy a decent slave.”

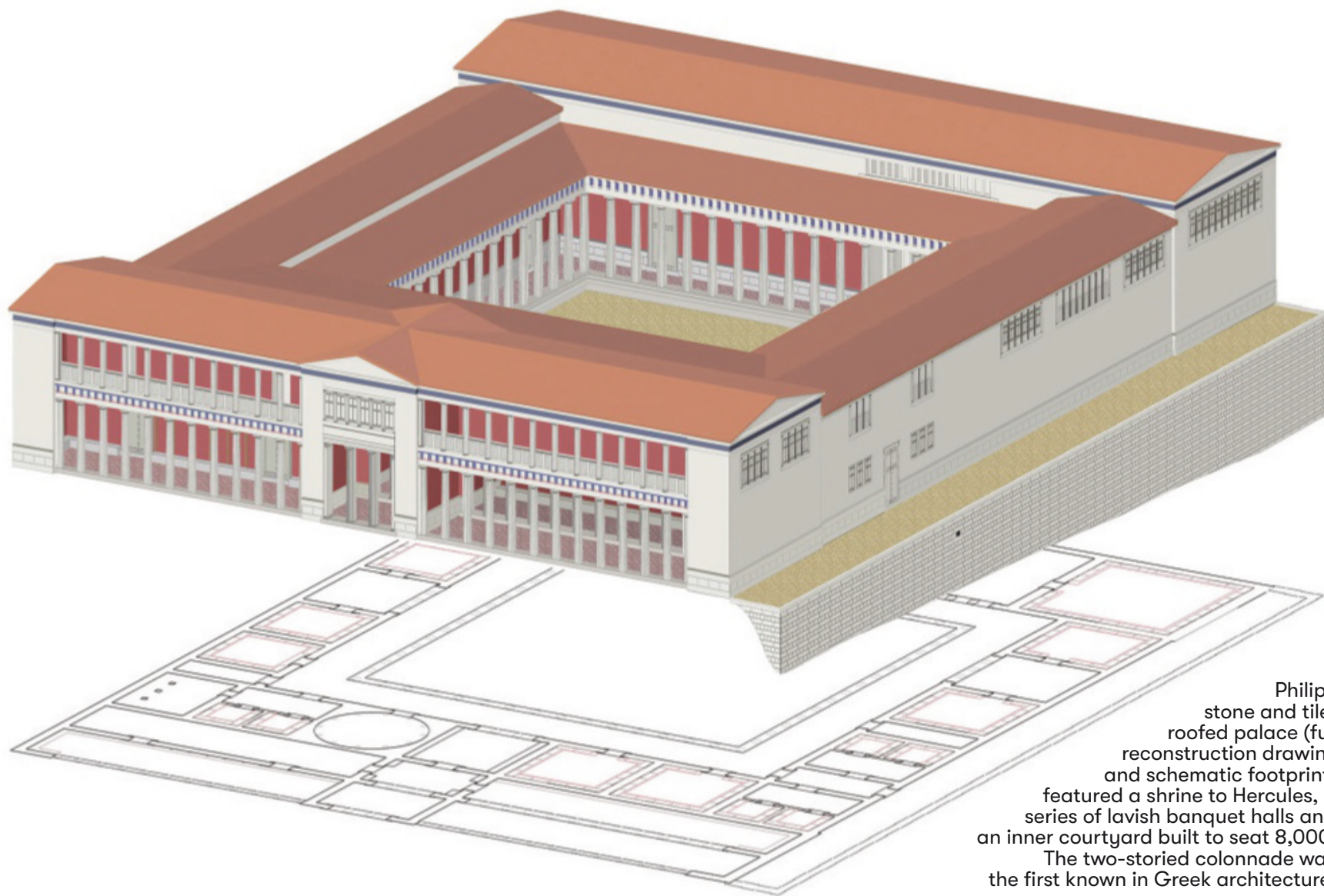
When Philip was growing up at the Macedonian court—based at the administrative capital of Pella, with Aigai reserved for royal weddings, funerals and other ceremonial occasions—he learned to hunt, ride and fight in combat. He also studied Greek philosophy, drama and poetry, and absorbed the necessity for ruthlessness in politics. The palace was a viper’s nest of treachery and ambition, and royal



cats. Kottaridi doesn’t drive, won’t fly, refuses to use a smartphone, ignores most of her email and has planted more than 1,600 trees at Aigai, mainly for the birds. She has published six books and 150 academic papers, and in 2008 she was awarded the prestigious Golden Cross of the Order of the Phoenix by President Karolos Papoulias of Greece for her contributions to knowledge of the ancient world. “People ask why I have no children,” she says. “It’s really because I adopted Alexander the Great. I fell in love with him when I was young—not the mythical figure but the man. He was so much more than a military genius. He opened up the Silk Road. He built these amazing Hellenistic cities in Tajikistan, Afghanistan, Pakistan, Egypt, with freedom of religion, tolerance for different cultures, equal oppor-

COLOSSAL AMBITION

Philip's vast royal complex, covering an area of nearly four acres, larger than any monument in Athens, must have reminded his Greek neighbors that his kingdom had defeated them.



Philip's stone and tile-roofed palace (full reconstruction drawing and schematic footprint) featured a shrine to Hercules, a series of lavish banquet halls and an inner courtyard built to seat 8,000. The two-storied colonnade was the first known in Greek architecture.

“Just earth, earth, earth. Nothing but earth for 40 days. **Then the miracle.**”

children were frequently murdered by rivals to the throne. Macedonia was a violent, unstable, hypermasculine society surrounded by enemies.

In 359 B.C., Philip, 23, saw his older brother King Perdiccas III and 4,000 men get slaughtered by the Illyrians, a rebellious warlike people in Upper Macedonia. His other brother had been murdered in a palace conspiracy, and since Perdiccas III's heir was a small child, the Macedonian Assembly appointed Philip as regent to the throne, and then as king. “He inherited a very old-fashioned tribal kingdom, with an economy based on livestock,” says Kottaridi. “Philip had lived in Thebes for a few years, and he brought new ideas from Greece. He introduced coinage. He turned this city into a politically functioning space, and he completely revolutionized the military.”

Macedonia had no full-time professional soldiers, just conscripts and volunteers. Philip instituted regular pay, better training and weapons, a promotion pathway, and a system of cash bonuses and land grants in conquered territories. He invented a highly effective new weapon, the *sarissa*, a 14- to 18-foot pike with an iron spearhead, and he trained his infantry to fight in a new phalanx formation. Like a traditional Macedonian warrior-king, Philip always led from the front in battle, charging toward the enemy on horseback. In addition to minor wounds, he lost an eye to an arrow, shattered a collarbone, maimed a hand and suffered a near-fatal leg wound, which left him limping for the rest of his life. The Roman historian Plutarch tells us that “he did not cover over or hide his scars, but displayed them openly as

symbolic representations, cut into his body, of virtue and courage.”

Philip inherited 10,000 part-time infantrymen and 600 cavalry, and built this up to 24,000 infantry and 3,000 cavalry. None of the city-states in Greece had such large standing armies. Nor did they foresee that Philip would use his military, along with cunning diplomacy and seven strategic marriages, to bring nearly all of Greece, a large swath of the Balkans and part of what is now Turkey under ancient Macedonian rule. “This is an incredible achievement for someone they dismissed as a barbarian, and very important for Alexander,” says Kottaridi.



NINETEEN MILES FROM AIGAI, just outside the village of Naoussa, lies a tranquil clearing with caves, springs and ancient carved limestone benches. This is Mieza, or Sanctuary of the Nymphs. When Plutarch came here in the second century A.D., locals told him that this was where Aristotle had tutored the young Alexander. Guidebooks and travel websites impart the same information to modern tourists, and road signs point the way to “Aristotle’s School.”

It is immeasurably intriguing that Alexander, the ancient world’s greatest conqueror, was taught by Aristotle, the great philosopher. How did the experience shape Alexander’s intellect, decision-making, interests and outlook? Would history have run a different course if the young prince had been tutored by someone more ordinary?

It was Philip’s idea. Alexander, the son of his fourth wife, Olympias, was a bold, headstrong boy of unusual intelligence. When Alexander reached age 13, Philip summoned Aristotle to the Macedonian court. There was a connection between the two families: Aristotle’s father had been a friend and court physician to Philip’s father, Amyntas III. There was also bad blood: Philip had razed Aristotle’s hometown of Stagira six years previously and sold most of its inhabitants into slavery. Nonetheless, the two men came to an agreement. Aristotle would instruct Alexander, and in return Philip would rebuild Stagira and resettle its citizens there.

For the next three years, Aristotle, a curmudgeonly figure who had small eyes, wore many rings and spoke with a lisp, tutored Alexander in biology, ethics, literature, mathematics, medicine, philosophy, politics, rhetoric and zoology. Plutarch describes

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At Lefkadia, 20 miles from Aigai, the Tomb of Judgment pays tribute to Macedonian valor. The great painted facade incorporates images of a warrior conducted into the underworld by the god Hermes.









A restored mosaic floor inside a banquet room of the palace at Aigai. The elaborate botanical motif was created with beach pebbles of various shades.

A marble-inlaid floor from an assembly room. Scholars speculate that a single workshop produced the palace flooring, a decorative innovation later adopted across the Hellenistic world.

the two of them sitting on the stone benches and discussing philosophy, and strolling through nearby orchards and vineyards. Modern guidebooks and history books repeat this romantic description, much to Kottaridi's annoyance.

"It is idiotic!" she says. "From 13 to 16, Alexander and his peers learned how to fight. They would have done this in a gymnasium, a combination of school and military academy, with different areas to sleep, eat, study and fight. There is no evidence of facilities like this at the Mieza sanctuary. There is no room for them!"

In fact, Kottaridi's colleagues have partially excavated the remains of a gymnasium seven miles away, near an ancient theater, and they have dated it to the time of Philip II. To the displeasure of the villagers in Naoussa, for whom "Aristotle's School" has constituted a tourist attraction since the second century, local archaeologists now believe that Aristotle taught Alexander and probably 150 other students at this gymnasium. Philip likely built it in order to supercharge his elite warrior class, in

preparation for his planned invasion of the Persian Empire.

I visit the place with Ioannes Graekos, an affable archaeologist who used to work at Aigai and now oversees a museum in the nearby town of Veria. There isn't much to see at the gymnasium site—a few old digs on a large area of overgrown land—because the excavation stalled for lack of funding. Nonetheless, Graekos is able to conjure up what once stood here: a massive two-story building with dining rooms, wrestling and fighting areas, and classrooms. "Alexander and Aristotle probably visited the Mieza sanctuary, because it was so close, and so pleasant, but the real schooling took place here," he says.

Aristotle's fascination with nature, and his belief in the scientific method, exerted a strong influence on Alexander, who took naturalists with him as he marched his army across Asia. Alexander apparently sent their reports back to Aristotle, accompanied by flora and fauna samples. He also included scientists, engineers and philosophers in his retinue, and opened up intellectual contacts between East and West. When



their student-teacher relationship ended in 340 B.C., Aristotle gave his own, annotated copy of the *Iliad* to Alexander, who carried the book to Asia and famously placed it under his pillow, next to his dagger, while he slept.

In one important regard, Alexander and Aristotle disagreed. The philosopher thought that all non-Greek people were barbarians and potential slaves. When Alexander started hiring foreigners in his army and administration, the relationship cooled. “Alexander wanted to expand the world and prove what a mixture of people can do and be,” says Graekos. “He wanted citizenship to mean the same thing for his subjects in Afghanistan and Persia as in Macedonia. This was anathema to Aristotle, who advised Alexander to treat people from other nations as you treat plants and animals.”

Anthony Everitt, the British author of the recent biography *Alexander the Great*, agrees that Aristotle was a hard-core nationalist. Talking by phone, he jokingly compares the philosopher to a “Brexiteer.” But he disagrees with Graekos’ and Kottaridi’s portrayal of Alexander as a pan-ethnic idealist who wanted to bring races and creeds together. “Alexander was driven by the excitement of fighting, which he loved, and the Homeric idea that war brought glory,” he says. “Once he had defeated the Persian Empire, he needed a practical way of governing a vast territory with many different languages. His solution was to hire locals. Gradually this led to the blending of cultures.”



ANGELIKI KOTTARIDI WAS a 20-year-old archaeology student in 1977 when her professor, Manolis Andronikos, invited her on a dig at Aigai. He had been excavating the *tumuli*, or burial mounds, near the modern village of Vergina. An English historian, Nicholas Hammond, had suggested that the tumuli and ruined palace belonged to the lost city of Aigai, and Andronikos agreed with him.

After the breakup of the Macedonian kingdom by the Romans in the second century B.C., Aigai fell into decline and obscurity. Then, in the first century A.D., a massive landslide buried the city and consigned it to oblivion, although a large burial mound remained clearly visible at the edge of the plain.



On the facade of Philip’s tomb, a frieze depicting Macedonian nobles at the hunt includes a rare portrait of the young Alexander, painted during his lifetime, on horseback, clad in a purple chiton.

Much of Aigai’s pomegranate tree-studded terrain awaits excavation. In this area are hundreds of grave mounds dating from the 11th to 2nd centuries B.C.

Andronikos called it the Great Tumulus, and that’s where he and Kottaridi were digging.

“I was thrilled that he chose me to help, but it was a very ugly excavation,” she says. “Just earth, earth, earth. Nothing but earth for 40 days. Then the miracle.” Excavating 16 feet down with a small hoe, Andronikos uncovered two royal tombs and dated them to the fourth century B.C. Other royal tombs discovered nearby had been looted in antiquity. But these newly unearthed ones were sealed and intact. That night, with guards posted at the dig, the two researchers barely slept.

The following day, they pried open the marble door to the first tomb. They stepped into a large, vaulted, double chamber strewn with smashed pottery, silver vases, bronze vessels, armor and weapons, including a golden breastplate and a beautiful gilded arrow quiver. Painted on one wall was a breathtaking frieze depicting Philip II and a young Alexander, both on horseback, hunting lions and other animals.

Opening a marble sarcophagus with trembling hands, Andronikos found a small golden coffin, or

larnax, with a relief star on the lid. Lifting it, he saw burned bones and a golden wreath. A shiver ran down his spine. He was unable to breathe. If the dating was correct, he was almost certainly holding the bones of Philip II. “It was far too terrifying an idea for my brain to assimilate,” he later wrote.

The discovery, widely reported in the news media, was hailed as the archaeological find of the century. (Some archaeologists have disputed that Philip II’s bones were in the golden *larnax*, but the latest research, and the weight of professional opinion, now indicates that Andronikos was correct.) The following year, with Kottaridi as his assistant, Andronikos unsealed the unlabeled tomb of Alexander IV, the son of Alexander the Great. “I was the first to catalog the items coming out of these tombs, to describe, measure and draw them,” Kottaridi says. “An unbelievable honor.” After finishing her dissertation in 1981, she worked as Andronikos’ assistant until he retired in 1989. Kottaridi took charge of Aigai in 1991 and has been overseeing it ever since.

“When Manolis was here, we found the theater, the acropolis on the mountain, and four royal tombs,” she says. “Since I’ve been in charge, we have excavated more than a thousand tombs and found sanctuaries, new city districts, farmhouses, streets, fortifications. We have a much clearer idea of the history and the form of the city. It was spread out with different districts serving different functions.”

Kottaridi’s plan for Aigai is based on the same principle. She has been creating a “Polycentric Museum,” with separate and distinct units scattered over a wide area and integrated with the ongoing archaeology. The Museum of the Royal Tombs, completed in 1993, is a dark, atmospheric, underground space inside the Great Tumulus. Here one can see the tombs, frescoes and spectacular golden grave goods of Philip II, Alexander IV and other kings.

The site of the palace is nearly a mile away, on a broad terrace of land in the foothills. On a quiet Sunday afternoon, with Kottaridi in the passenger seat, I drive up there. Here Philip’s immense structure, under restoration by Kottaridi, is rising for the second time. The peristyle, or main courtyard, is 130,000 square feet—room for 8,000 people to gather. “This was a political building, not a home, and it was open to the public,” she says. “It was a place for feasts, political meetings, philosophical discussions, with banqueting rooms on the second floor and a library. The peristyle was flanked by stone colonnades, which we are restoring to a height of six meters. We are redoing all the mosaics on the floor. It is very difficult to find stonemasons and mosaic-makers who can do this work by hand.”

The great palace, “utterly revolutionary and avant-garde for its time,” Kottaridi says, was two stories high and visible from the entire Macedonian basin. It was a symbol of Philip’s power and sophistication,



a reflection of his ambition, and a retort to the Athenians who had derided him and were now his subjects.



BY 336 B.C., after little more than two decades on the throne, Philip had transformed Macedonia from a struggling backwater into an imperial superpower. Now he was planning to



Fragments of a frieze, discovered inside Philip's tomb, included ivory figurines. Second from left, an arresting likeness of Philip. Far right, Alexander.

“Alexander was driven by the **excitement of fighting**, which he loved.”



invade the Persian Empire in Asia Minor. He had already sent an advance contingent of 10,000 troops. The rest of the army would join them after the marriage of his daughter Cleopatra (no connection with the Egyptian queen) in October. He turned the wedding into a huge gala for dignitaries and ambassadors from all over Greece and the Balkans.

"They crowned Philip with golden wreaths," says Kottaridi. "The wedding took place right here in the palace and there was a huge feast. The next morning they all gathered at the theater for the final celebration."

It began with a sunrise procession. Twelve men came through the theater holding up statues of the 12 Olympian gods. They were followed by a statue of Philip, suggesting that he had crossed the permeable line between men and gods and was now divine. Then came one-eyed Philip himself, scarred and limping, but radiating power and authority. He wore a white cloak and a golden crown, and most dramatically, he was unarmed. Macedonian men typically wore their weapons, but Philip wanted to convey his invincibility. When he reached the center of the theater, he stopped and faced the cheering crowd.

Suddenly one of his bodyguards stabbed him in the chest with a dagger, "driving the blow right through the ribs," according to the historian Diodorus. Philip fell dead and his white cloak turned red. The assassin sprinted to the city gates, where horses were waiting for him. Three bodyguards who were friends of Alexander gave chase, caught him and killed him on the spot.

The assassin was Pausanias of Orestes in Upper Macedonia, and Philip had recently jilted him for a new male lover. Pausanias was then gang-raped by a man named Attalus and his cronies, and turned over to the stable hands for more sexual abuse. When Pausanias reported this outrage to Philip, the king did nothing. Did Pausanias murder Philip for not punishing Attalus, as some scholars believe? Or was Pausanias the paid instrument of more powerful individuals who wanted Philip dead, as other scholars believe?

We know that Olympias loathed her husband and yearned for Alexander to take the throne. King Darius II of Persia is another suspect with an obvious motive: Philip was preparing to invade his empire. Prominent Athenians are under suspicion, because they resented Macedonian rule. The finger has also been pointed at Alexander, who had quarreled with his father and would gain the throne with his death.

That last theory is a foolish slander against Alexander, Kottaridi says. She suspects a plot by a rival



After Philip's murder, an oracle's prophecy came true: The king's legacy was carried on by a "son whose nature would be bold and lionlike."

Philip's stunning iron-and-gold armature is the most complete and best-preserved panoply from ancient Greece. The body armor would have been carefully fitted to his frame.

faction of nobles. Palace intrigues had long been a blood sport in Macedonia. The kings at Aigai—Philip was 46—almost never died of old age.



THE SEMICIRCULAR THEATER is a short distance from the palace and was built as part of the same complex. For Kottaridi, it is a place of the greatest historical significance, and she yearns to restore it. Standing in the wind, gazing at the grassed-over ruins, she describes the aftermath of Philip's murder, the chaos and panic, 19-year-old Alexander and his supporters marching up from the theater into the palace, where Alexander swiftly gained the support of the generals and was declared king.

She sighs and dabs tears from her eyes. "This is the very place where, in one moment, the history of the world changed for all eternity."

Alexander threw the biggest funeral in Macedonian history for his father. After burning the body on a pyre, attendants retrieved the bones, washed them in wine, wrapped them in purple cloth and laid them in a golden larnax. The larnax was then placed in a sarcophagus and the tomb was sealed.

Alexander, facing a revolt in Greece, marched out to crush it, and when he returned to Aigai a year later he threw a party. He invited many of the same dignitaries who had attended Cleopatra's wedding, and he presented a nine-day drama at the theater where they had witnessed his father's murder. After the celebrations, he launched his invasion of the Persian Empire, carrying out his father's plan with his father's army, siege machinery and many of the same generals. Although Alexander was a brilliant commander, and his campaign in Asia would far exceed anything that Philip had imagined, it was his inheritance that made it possible. Without Philip's war machine, there would have been no Alexander the Great. ♦

BYLINES

Photographer **Myrto Papadopoulos** last covered excavations at the site of Pylos for *Smithsonian*. Frequent contributor **Richard Grant's** most recent *Smithsonian* article was about Jack London.





HOMIE BREW HERO

**MEET THE GRADE
SCHOOL TEACHER
WHOSE BASEMENT
HOBBY HALF A CENTURY
AGO SPARKED **AMERICA'S
CRAFT BEER REVOLUTION****

by MATTHEW SHAER

photographs by BENJAMIN RASMUSSEN

< Charlie Papazian
outside his current
brewery—the detached
garage of his home
near Boulder, Colorado.
He grows his own hops
in a field nearby.

C

Charlie Papazian, “the Johnny Appleseed of good beer,” as an old friend describes him, “or maybe the Chuck Berry and Muddy Waters and Joey Ramone of beer, overthrowing the status quo,” lives about six miles north of downtown Boulder, Colorado, at the end of a rutted dirt road, in a modest two-story home with views of the Rocky Mountains. He’d fallen in love with the place on sight.

The isolated location, the light, the chortling brook in the backyard—perfect. Except for one thing. “You have to understand that I was used to brewing in basements,” he said when I visited him a few months ago. “And this house has no basement! So I had this vision. I’d convert the garage into a single-use facility, the ideal beer-brewing space.”

Papazian installed a glass-walled cooler, plus a custom-built, walk-in fridge with six-inch-thick foam-insulated walls he’d reclaimed from a defunct turkey farm. He left the original workbench and a few lockers and added several sets of shelves to stow the essentials: buckets of malted barley, rice, and yeast cultures, glass carboys for fermenting the beer, serpentine coils of tubing and strainers for trapping the errant grain, and a freezer full of hops.

These days, Papazian brews a five-gallon batch of beer about once a month—typically a lager or an ale. More in summer, less in winter. He does not sell it, preferring to dole out samples to friends. “I go to visit a buddy, or I give a talk, and I bring some beer,” he explained. “As a hello, or as a thank-you.” He offered me a pour of a recent concoction: a dark lager made with hops he’d grown in the field behind the garage. It tasted soft; each sip melted on the tongue, like chocolate. “It’s got a porter-like quality to it, doesn’t it?” he asked. “Very drinkable. Smooth and not overly assertive.”

Crossing the garage, he found the barley he’d used for a different batch. He encouraged me to taste a small handful of the grain. “You’ll notice that the longer you chew, the sweeter the barley gets,” he said. “That’s because the enzymes in your mouth are breaking down the starches.” He went on, “Now look, I don’t want to get too Zen-like, but what I’ve always loved about brewing is that you’re dealing with organisms. With biology, with chemistry! With life itself! Take yeast, for example: Depending on temperature, pressure, motion, it gives off different compounds. The beer changes with it.”

I followed him into the walk-in fridge. “These are the collectibles,” he said, dragging his finger over the bottles that lined the shelves. “The cooler out there—that has the beers for drinking. These are the beers for remembering.” He pulled down a few



Papazian in 1985. He dumped more than a few early batches. “Experimenting provided the only way to knowledge,” he says.

Papazian has kept detailed notes about his yeasty adventures in journals stretching back decades. Volume 4 covers the early ’80s.

JOURNAL

Brewmaster: Naizapap
LOG BOOM
BREW AD Beer with Balls
KOMB

IT DOES THE TRICK!

VOLUME 4
Nov, 1980 — April 1982

keepsakes. Canned editions from the beginning of his career, when he was still a grade school teacher, homebrewing in his spare time. Some early beers from San Francisco's Anchor Brewing Company, one of the first microbreweries in the United States. Collectible beers from trips to Denmark, South America, England. A beer he brewed on the occasion of the birth of his daughter, Carla, now 10 years old. He's saving that one for the day she turns 21 and can enjoy it with him.

I noticed an old poster, a little yellowed with age, hanging above one of the workbenches. "Relax," it read. "Don't worry. Have a homebrew." It was Papazian's motto. The words had come to him and his fellow homebrewer Charlie Matzen back in the 1970s. The words have since appeared on T-shirts, on bumper stickers and beer caps, and most famously, in Papazian's beer-making bible, *The Complete Joy of Homebrewing*, now in its fourth printing. Global sales of the book reportedly exceed 1.3 million copies, but that number, however impressive, doesn't come close to conveying the book's vast readership, for dog-eared copies are passed from one generation of beer-makers to the next, an initiation, a rite of passage. Many a successful brewmaster learned the trade from *The Complete Joy of Homebrewing*. "People still approach me and say, 'That mantra, it's changed the way I look at the world,'" Papazian said. "What a gift to be able to hear something like that."

If he sounded wistful, it was not for nothing. Although he continues to brew beer and to speak at beer events around the globe, Papazian, who is 71, is in the process of slowly withdrawing from the grassroots industry he helped create and sustain over the past four decades. He recently stepped down as head of the Brewers Association, the influential American trade group, and he has officially retired as maestro of the Great American Beer Festival, which he inaugurated in 1982. In an unmistakably valedictory gesture, he donated a battle-scarred old brew spoon, an original homebrewing recipe annotated by hand and a first edition copy of his book to the Smithsonian's National Museum of American History, where the items are now on display indefinitely. "I



“I REMEMBER GOING, ‘WAIT, WHAT THE HECK IS HOMEBREW?’ I HAD NO IDEA SUCH A THING WAS POSSIBLE.”



LIFE IS A BATCH

Clockwise from top left: Papazian pours malted grains into a pot of precisely heated water to make “wort” for a fresh batch of stout; a measured handful of hops taken from his garden, which is added to the wort; a carboy filled with stout wort, which will ferment for a week or more; a hydrometer to check the wort’s sugar content, which will be measured again after fermenting to calculate the amount of alcohol in the finished beer; a pot made for Papazian decades ago by the Wisconsin company Stoelting (it now specializes in ice cream equipment), which Papazian uses to strain grain husks before adding the wort to the fermenter; an instrument known as a “sparge arm” uses fresh hot water to rinse sugars from grains in the wort.



BEER IS NOT JUST A DRINK

It's a cultural boom. And a Smithsonian scholar is on the case

When she was hired three years ago to serve as curator of the Smithsonian's American Brewing History Initiative, *Washingtonian* magazine called her position the "Best Job Ever." For the first six months, though, Theresa McCulla spat out every beer she tasted—she was pregnant.

Since then she has made 30-odd research trips, sipping, documenting, collecting and interviewing. Among the brewers, maltsters and product designers she has tapped for oral histories are pioneers such as Charlie Papazian ("one of the more substantial and rewarding relationships I've established during my time at the museum," she says) and Annie Johnson, the first African-American awarded Homebrewer of the Year (2013), who has worked with a Seattle company that manufactures semi-automated homebrewing equipment aimed in part at people with disabilities.

Traveling to Random Lake, Wisconsin, McCulla met with woodworkers who design and produce 80 percent of America's barroom tap handles. "Tap handles are often the first line of communication between a beer drinker and a brewer," says McCulla, who has a doctorate in American studies from Harvard and a knack for finding cultural history in seemingly unremarkable objects. She has collected early annotated homebrewing recipes, beer labels from former upstarts like Sierra Nevada, even the vibrating tabletop football game that Sam Calagione, founder of Dogfish Head, bought at a thrift store and retrofitted to shake hops into his boil kettle, thus inventing "continual hopping" and becoming a demigod to hop-heads nationwide.

"America has the most creative and dynamic small brewing industry in the world," McCulla says. Curiously, many of the most important American innovators weren't initially focused on business. "Microbrewing and craft brewing grew out of grass-roots movements like do-it-yourself culture and the counterculture. These brewers defined themselves as united in a struggle to make beers that were individualistic, and they created a new wave of small businesses, often with quirky personalities, that emphasized causes like environmental sustainability and community engagement." —ARIK GABBAI

think the curators were in awe that I would be willing to give them something so personally valuable," Papazian joked to me. "I'm just in awe that they wanted it."

Jim Koch, the founder of the Boston Beer Company, which makes Samuel Adams, credits Papazian with popularizing craft beer in the United States. Papazian's retirement represents "the end of an era," Koch wrote in an email. "It's hard to imagine a Brewers Association, a Great American Beer Festival or a craft beer industry without Charlie steering the ship. There's an adage in business that no one is irreplaceable. His departure is going to put that maxim to the test."



TODAY, WHEN MANY STATES in the nation are home to 100 breweries and some states count six or eight times that number, it seems almost impossible to imagine that beer was a relatively uniform and even uninspired commodity for most of recent American history. Lagers pale in color and low in alcohol were popular as refreshment but did not engender much connoisseurship or olfactory debate. It was the stuff you slugged back after mowing the lawn on a hot day.

In 1949, the year Papazian was born, the market was almost entirely dominated by big corporations that specialized in largely interchangeable German-style beers: Miller, Pabst, Budweiser, Coors. "I grew up in a mid-century culture, where with food, it was cool to be homogeneous," Papazian recalled. "You turned on the TV, and it was Velveeta cheese, it was frozen dinners, it was white bread. Wonder Bread! Flavor diversity wasn't really a thing."

Papazian was raised in a quiet community called Warren

"WE'D OPEN THE SPICE CABINET, AND SAY, 'LET'S PUT SOME CINNAMON IN THERE, SOME ALLSPICE.'"

Township, in northern New Jersey. He remembers his upbringing as idyllic. His mother stayed at home with him and his two brothers, and his father, a chemical engineer, managed a manufacturing plant. Occasionally, his parents would buy a six-pack of beer for guests; they kept a liquor cabinet in the living room, but it collected dust. "They weren't really drinkers," Papazian told me.

In 1967, Charlie, who was adept with numbers, left for the University of Virginia to study nuclear engineering. He had few longer-term plans. He mulled the possibility of a career in the Navy, but the counterculture appealed to him, too. He grew his wiry brown hair long, played some music, made the

"People expect some sort of high-tech lab," Papazian says. "But it's a version of the same set-up I've always used. I've just gotten better at the brewing."



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pilgrimage to Woodstock. (The ticket stubs and muddy sneakers he wore to the festival are displayed in a vitrine in his home.)

One afternoon in 1970, Papazian was lazing around his Charlottesville apartment, drinking Pabst Blue Ribbon, when a friend mentioned that he'd run into a neighbor, an "old-timer" in his early 70s, who'd learned to brew beer during Prohibition, and was apparently still making it, right there in his basement. "I remember going, 'Wait, what the heck is homebrew?' I had no idea such a thing was possible," Papazian recalled.

A few days later, he paid a visit to the neighbor, who offered Papazian a bottle of a Prohibition-style ale: an unboiled, fermented mixture of malt extract, sugar, bread yeast and water. "It was crystal clear, pale, beautiful-looking, effervescent beer," Papazian said. "And the taste was *cidery*, almost. I wouldn't say it was better or worse than store-bought beer, but it was very different, and that was enough. I was completely fascinated."

One of Papazian's early brew spoons, now at the Smithsonian. In making beer, he says, "The spoon is the hero, mixing and swirling things. Everything starts right there."



Papazian was working part time as a janitor at a Charlottesville day care facility, which had a kitchen and a capacious basement. "After the kids had gone home, my friends and I, we'd formulate the recipe upstairs," he said. "You'd open up the malt, put it in a pail, add sugar, add the water, add the yeast, and bring it downstairs and let it ferment. It was pretty basic."

Several early batches were poured directly down the drain, but Papazian's skills gradually improved. He learned that dextrose made for better flavor than sugar, and that bread yeast he'd been buying from the supermarket was no replacement for the more refined yeasts on sale at the wine-making supply store. "The beer got good enough that we bottled it up and started handing it out at parties," Papazian recalled. "People loved it. They were constantly asking, 'How did you make this?'" In response, he wrote up a two-page instructional manual. "It never occurred to me to keep



A beer coaster printed with Papazian's motto. "AHA" refers to the American Homebrewers Association (now part of the Brewers Association), which he founded in 1978.



▲ The 2019 Great American Beer Festival featured more than 4,000 varieties. Here revelers sample offerings from WeldWerks Brewing in Greeley, Colorado.

it to myself,” he went on. “I was all about sharing it as widely as I could.”

After college, while traveling with a friend to Wyoming, Papazian passed through Boulder, then as now a college town with a healthy population of hippies and a growing tech sector. Papazian decided to stay. “I spent about a month crashing on a friend’s floor, applying for jobs,” he told me. He landed one as a janitor, and another at a shoe manufacturing plant; he quit them both. Then a friend told him that the private elementary school where she worked was looking for a new teacher. “My degree was in engineering. I had no teaching certification. But I went in, and the boss said, ‘Hang out for a day and see if you like it.’” He stayed for ten years.

Papazian had left his brewing equipment back in Charlottesville, assuming his beer-making days were behind him, but his friends knew about his talent, and they wanted lessons. “I remember going, ‘All right, fine, give me the money, and I’ll go get the trash pail at Kmart, and I’ll get the yeast at the supermarket,’” Papazian recalled.

He offered classes, once a week, in his kitchen.

There were always more students than spots. “You had attorneys, airline pilots, other teachers, but also people who were just hanging out. Musicians, outdoors-types,” he told me. “A real mix.” Among his earliest students was Jeff Lebesch, who would go on to co-found New Belgium Brewing, in Fort Collins, Colorado, purveyors of Fat Tire Amber Ale, as well as Russell Scherer, who became the original brewmaster at Wynkoop, a Denver brewery co-founded by John Hickenlooper, the former governor of Colorado.

Together with his students, Papazian began experimenting with flavors and ingredients. “The spice cabinet in that kitchen was right above the stove, and every once in a while, we’d open it, and say, ‘Let’s put some cinnamon in there, some allspice,’” Papazian told me. “We messed around with tea, honey, fruit.” In retrospect, he was pushing the limits of an age-old art and science—redefining beer itself.



ONE AFTERNOON, PAPAZIAN and I arranged to share a couple of pints in the taproom of his local brewpub, Avery Brewing Company, which occupies a series of low industrial buildings in Boulder, not far from his home. As we walked through Avery’s front doors, a roar went up—“Charlie!”—and the staff assembled themselves in a reception line, proffering hands and clapping Papazian’s shoulders. We found a seat. Papazian studied the menu. There was nary a pilsner to be found. Instead, there was an assortment of India Pale Ales, promising varying levels of alcohol and varieties of hops; a persimmon-and-wheat ale; a hazelnut, toffee and mocha-flavored ale called “Old Jubilation”; a “PB&J stout,” brewed with raspberries and peanuts and aged in bourbon barrels. Papazian looked amused. “To see the way the palate of the American beer drinker has evolved,” he said, “well, it’s really something, isn’t it?”

I asked if back in the 1970s he could have imagined walking into a brewery and ordering a peanut-butter-and-jelly-flavored stout. He shook his head. “It’s difficult to stress how different things were—at every level,” he said.

Back then, brewing beer at home wasn’t even legal, and selling or distributing homebrew was an offense punishable by hefty fines. But in October 1978, President Jimmy Carter legalized homebrewing nationwide. In December of that year, Papazian and Charlie

TRY YOUR HAND at one of Charlie Papazian’s beer recipes at [Smithsonianmag.com/homebrew](https://www.smithsonianmag.com/homebrew)

Matzen, a friend and former student, published the debut issue of *Zymurgy*, a beer-making magazine named for the science of fermenting yeast for beer or wine. Inside were recipes, comics, columns and reported pieces; one dispatch in the first issue covered the beer-making scene in Hawaii.

“What we did was go down to the Boulder Public Library,” Papazian said, “and go through the Yellow Pages for different major cities, looking for beer-making supply stores, and we’d mail out sample copies.” As part of the \$4 subscription price, *Zymurgy* promised membership in a brand-new organization, the American Homebrewers Association. “We knew there were all these homebrewers out there, and we knew how passionate they were. The AHA was our attempt at connecting everyone, at bringing them together as a community.”

Membership requests rolled in. Some were sent by individuals, others by informal clubs, including the Homebrew Computer Club, a group founded by Steve Jobs and Steve Wozniak, and the Maltose Falcons, an organization generally considered the first of its kind in the United States. In 1981, Papazian traveled to England to serve as a judge at the Great British Beer Festival. “I thought, ‘This idea of celebrating national beer culture—I love it.’” Surely, the concept was exportable.

For the first Great American Beer Festival, held in 1982 in a conference room at Boulder’s Harvest House Hotel, Papazian secured the participation of a handful of small breweries, including Anchor Brewing from San Francisco and Sierra Nevada, from Chico, California, which had just begun selling its now-famous Pale Ale, widely credited with bringing piney, citrus-flavored hops to the forefront of American beer-making in the decades to come. Behemoths such as Coors were invited to participate, but only if they brought beers that “were special enough, and reflected some kind of culture,” as Papazian put it.

Less than two years later, Papazian published *The Complete Joy of Homebrewing*. “So now you’ve decided to brew your own beer,” he wrote in the introduction. “In essence, you’ve given yourself the opportunity to make the kind of beer that *you* like. Reading this book and learning the fundamentals will give you a foundation to express yourself unendingly in what you brew. Remember, the best beer in the world is the one you brewed.”

The book rocketed off shelves. Craft beer supply stores couldn’t keep it in stock. Papazian quickly became a cult figure, the leader of a movement.

BYLINES

Matthew Shaer, a *Smithsonian* correspondent, last wrote about a family that feels no pain.
This is Denver-based photographer **Benjamin Rasmussen**’s first assignment for *Smithsonian*.

“You know when you were a kid, and you were on this journey to find great music, and then someone slipped you an eight-track, or a cassette, and it changed your world?” Marty Jones, a longtime Colorado beer world promoter and enthusiast, asked me. “For people who loved beer, it was like that with Charlie and *The Complete Joy of Homebrewing*.”

Papazian hired a marketing director, an accountant, some office staff. Just a few years earlier, there were five or so microbreweries in the United States; within a dozen years, there were close to 200. “We now have more than 8,000 breweries in the United States,” Theresa McCulla, curator of the American Brewing History Initiative at the National Museum of American History, told me. “But these small professional breweries are almost entirely founded by people who began as homebrewers. To think about craft beer, you really have to understand how home-

“HERE’S A CRAZY FACT. IN 1975 COORS WAS THE ONLY BREWERY IN COLORADO.”

brewing became so popular, and continues to stay so popular as a social phenomenon and a hobby that so many Americans enjoy.”

By 2002, the Great American Beer Festival—a multi-day extravaganza and proving ground for upstart breweries—had moved to the Colorado Convention Center, in downtown Denver, and attendees could sample more than 1,800 beers. In 2019, the year of Papazian’s retirement, attendance exceeded 60,000. Four thousand beers from 2,300 breweries were on tap; every state in the country and the District of Columbia were represented. The awards were split into more than 100 categories—from mainstays like Pilsner and Brown Porter and Cream Stout to contemporary powerhouses like Juicy or Hazy Imperial India Pale Ale and American-Style Sour Ale to kookier offerings like Chili Beer (brewed with hot peppers) and Mixed-Culture Brett Beer (Brett, short for *Brettanomyces*, or British fungus, is a type of wild yeast).

To peruse the list of winners over the decades is to observe American beer, which originated with recipes borrowed from Germany and the British Isles, come fully into its own. “It used to be Europe that drove what was in style,” a veteran of Colorado’s beer industry told me. “Now it’s American brewers who have the creativity, who start trends that pop up elsewhere. The festival, and Charlie, are the biggest parts of that transformation.”

For Papazian, the labor of brewing makes the result all the more enjoyable. “The best beer in the world,” he likes to say, “is the one you brewed.”



ON A BRIGHT DECEMBER DAY Papazian and I made a trip to downtown Denver, to visit Wynkoop Brewing Company, Colorado's first brewpub, which was founded in the late '80s. The operation spills over several floors, with big windows that allow guests to watch the beer being made; a picture of Papazian, an early supporter and a close friend of Hickenlooper's, hangs on the wall.

Papazian had not called ahead, and at the hostess stand he ducked shyly to avoid detection, but he was spotted anyway, and soon the brewmaster was looming over our table. He looked

at me and cocked a thumb toward Papazian. "This is the legend right here," he said. "The real OG."

Papazian opened the menu and selected a pint of Rail Yard, a mild amber ale brewed with Tettnanger and Fuggle hops.

We left Wynkoop and drove a mile and a half to the History Colorado Center, a Denver museum, which last spring opened an exhibition entitled "Beer Here! Brewing the New West." The organizers, Jason Hanson and Sam Bock, are beer lovers and occasional homebrewers.

We climbed the stairs to the second floor and wended through the start of the exhibition, with its old saloon furniture and antique bottles and paintings of Colorado's first industrial breweries. Next came the Prohibition years, when rogue beer-makers and distillers were chased by pistol-wielding cops. Then came the rise of mass-market beer, the proliferation of the aluminum can, and old television advertisements for Coors, with their gauzy footage of snow-painted peaks. "Here's a crazy fact," Hanson said. "In 1975 Coors was the only brewery in Colorado." (The state is now home to more than 400.)

We turned the corner and stepped into the kitchen of Papazian's first Boulder home—the room where he taught his first classes, and where *Zymurgy* and the AHA were born. Hanson said, "We wanted the flow of the exhibition to go from Coors to Charlie's kitchen, because the craft scene really grew out of a reaction to mass-produced beer, right?"

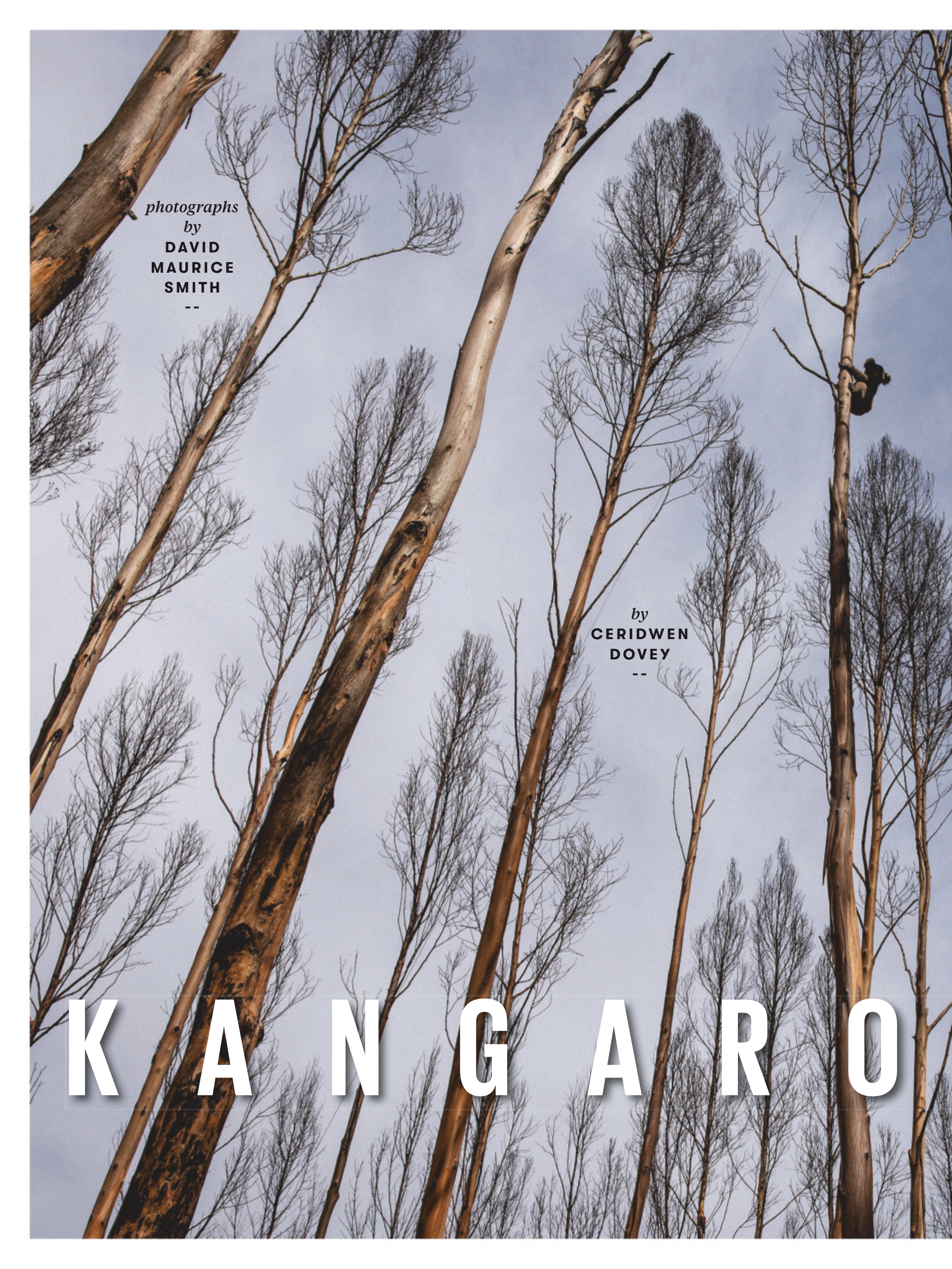
"The moment," Bock added, "Americans decided not to just accept beer they didn't like."

The museum staff had based the reproduction on old photographs Papazian had provided them. Everything was period-accurate, from the vintage stovetop to the Kit-Cat Klocks with their beady eyes and swinging tails.

"They got it exactly right," Papazian said. He ran his hand lovingly over the replica brew pails, the glass carboy, the long-handled wooden spoon.

"Don't forget about that," Hanson said, tapping a sticker on the front of the fridge.

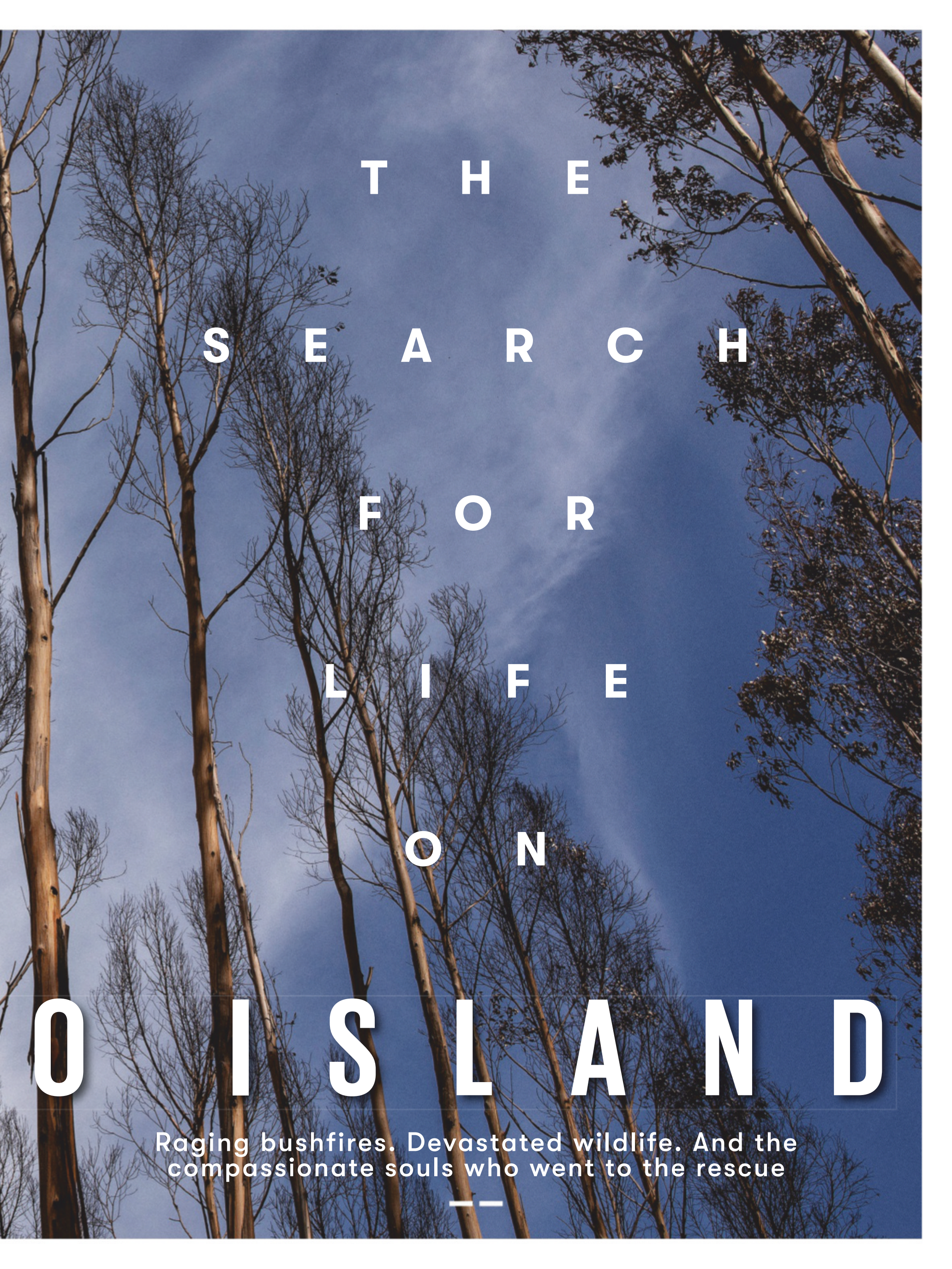
Smiling, Papazian read the words aloud: "Relax. Don't worry. Have a homebrew." ♦



photographs
by
**DAVID
MAURICE
SMITH**
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by
**CERIDWEN
DOVEY**
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KANGAROO

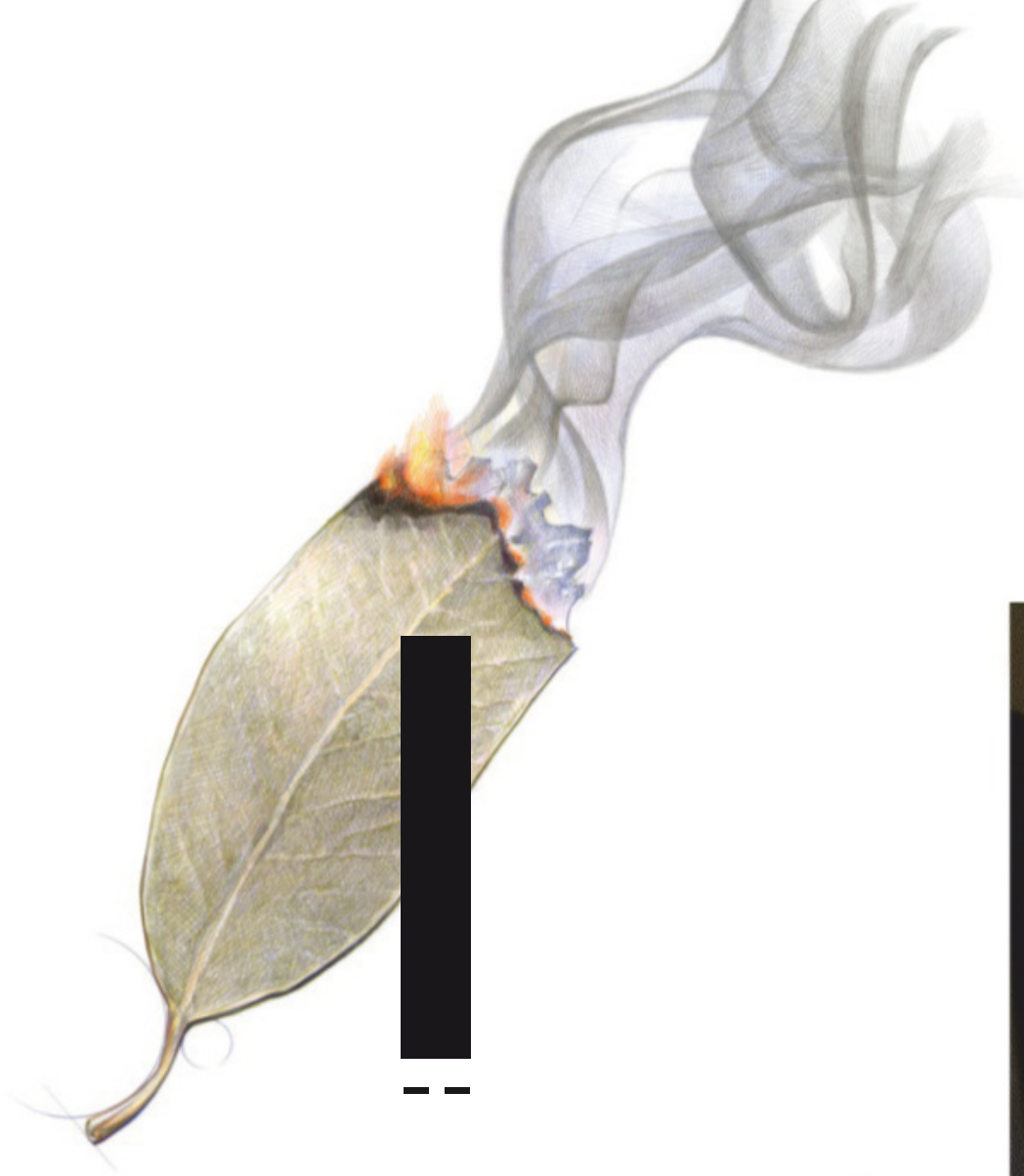


T H E
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Raging bushfires. Devastated wildlife. And the
compassionate souls who went to the rescue

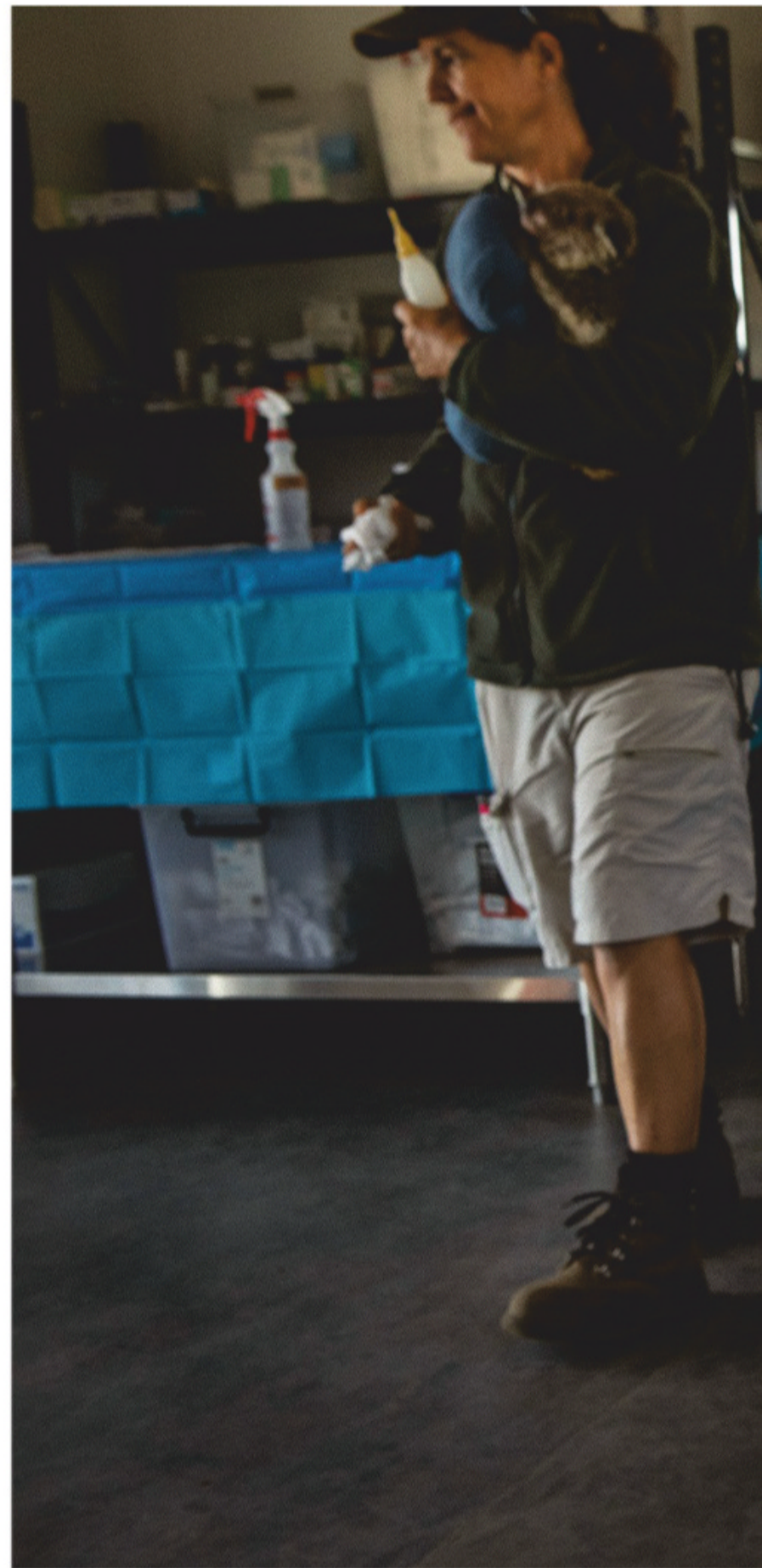
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ARRIVED ON KANGAROO ISLAND bracing myself for the sight of acres of blackened trees and white ash, but I had not expected the parasitic bright green vines wrapped around almost every charred trunk, glowing phosphorescent in the sunlight. This was no parasite, I learned. It was epicormic growth, bursting directly from the burnt trunks themselves, a desperate bid for photosynthesis in the absence of a leaf canopy.

The growth looks nothing like a eucalyptus tree's normal adult leaves. It's soft and waxy, with rounded edges instead of long pointy tips, and it blooms from cracks in the trunks or right from the tree's base, rather than along the branches where leaves typically grow. It is beautiful, and also very strange, in keeping with the surreal phenomena that became almost commonplace over this past apocalyptic Australian summer, even before the coronavirus pandemic further upended life as we know it. A few weeks earlier, in Sydney, I'd watched red-brown rain fall to the ground after rain clouds collided with ash in a smoke-filled sky. During a recent downpour here on Kangaroo Island, burnt blue gum trees foamed mysteriously, as if soap suds had been sprayed over them.

Even in less strange times, Kangaroo Island can feel like the edge of the earth. Although it sits fewer than ten miles off the southern coast of Australia, about 75 miles from Adelaide, it is a geographical Noah's Ark; its isolation from the mainland 10,000 years ago because of rising seas transformed it into an ecological haven. It is vast and rugged, with dramatic views of bush or sea- or cliff-scapes in every direction. National parks or protected wilderness areas make up a third of the island's 1,700 square miles. Much of the rest of the island is farmland or privately owned backcountry. In recent years, the island has rebranded itself as a high-end tourist paradise, with unspoiled wilderness, farm-to-table produce, fresh oysters, and wine from local vineyards. But while there are luxury accom-



PREVIOUS SPREAD: A lone koala clings to a charred trunk in a severely burned plantation of eucalyptus trees.

The fires are **almost certainly decreasing biodiversity** despite “the oft-repeated rhetoric about the resilience of Australian flora.”

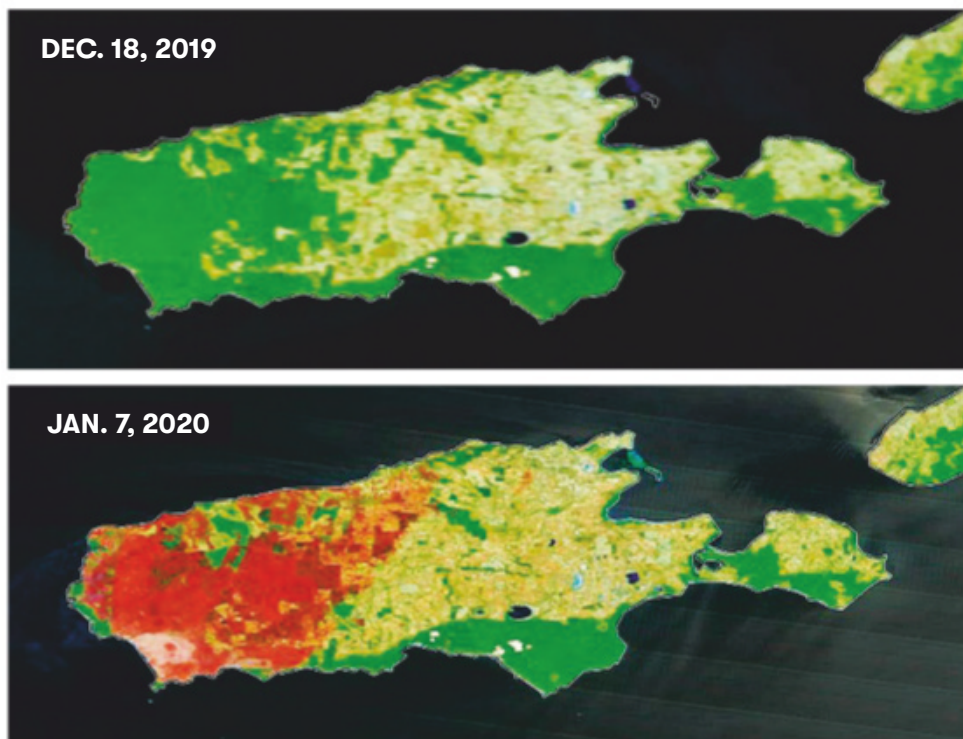


Dana Mitchell feeds an injured baby koala at the Kangaroo Island Wildlife Park, which Mitchell owns with her husband, Sam. The park has treated more than 600 koalas since January.

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AN ISLAND AFLAME
Kangaroo Island sits a few miles off the coast of South Australia. At the height of the fires, in January, most of the island's western half was ablaze, as seen in these images based on data from a NASA satellite.



modations here and there, the island's few small settlements feel decidedly unglamorous, befitting laid-back country and coastal towns.

The fires started here in December, after dry lightning strikes on the island's north coast and remote western bushland areas, and then escalated and jumped containment lines, ripping through the island in early January, with high winds and hot temperatures fueling the front. Two people died, and hundreds of properties were affected, many of them farms. Tens of thousands of stock animals were lost in the blaze. While the bushfires all over Australia were horrific, burning more than 16 million acres—nearly eight times the area lost to fire in Brazil's Amazon basin in 2019—people around the world focused on Kangaroo Island because of the relative scale of the fires, which consumed close to half the island, as well as the concentrated death and suffering of the island's abundant wildlife, including wallabies, kangaroos, possums and koalas. Wildlife experts worried that certain vulnerable species endemic to the island, such as the glossy black-cockatoo and a mouse-like marsupial known as the Kangaroo Island dunnart, might be lost forever.

Flinders Chase National Park, the vast nature preserve encompassing the island's western edge, is closed indefinitely. There were rumors that parts of this natural bushland, which depends on fire to propagate, might never fully regenerate, because the heat from the fires was so intense that the soil seed bank may have been destroyed. Climate change researchers are

Tens of thousands of koalas were killed in the island blaze, and an additional number perished from starvation or dehydration after the blue gum plantations where they lived were destroyed.

The remains of a Tamar wallaby. Where the fires raged, populations of kangaroo and wallabies were devastated; up to 40 percent of the island's unique kangaroo subspecies may have been killed.





Old divides are widening between stock farmers and those motivated to **protect the island's unique wildlife.**



warning that while fires in Australia are “natural,” they’re now so hot and frequent that even fire-adapted plants don’t have the chance to recover. A major fire burned 85 percent of Flinders Chase just 13 years ago. Matt White, an ecologist at the Arthur Rylah Institute for Environmental Research, in Victoria, told me the fires are almost certainly decreasing biodiversity, despite “the oft-repeated rhetoric about the resilience of Australian flora.” Now the fires

are out, and the immediate danger has passed, but life on the island is very far from normal. On certain parts of the northern coast, coves are silted with ash, black tide marks on the sand. Outside several towns are signs directing people to a Bushfire Last Resort Refuge, a chilling reminder of how bad things can get.

Kangaroo Island’s east coast, where I disembarked from the ferry, seemed relatively unscathed, but as I



A climber wielding a “koala pole” persuades an animal to leave its towering hideout and descend to the ground, where rescuers could examine it and crate it for later treatment.

drove west through the central agricultural area, known as the Heartlands, I crossed a line into devastation. The color palette shifted from the beige and olive green of roadside scrub to charcoal trunks and scorched leaves in shades of orange, an uncanny simulacrum of autumn. The deeper into the fire grounds I went, the more the shock of that green epicornic growth scrambled my perceptions, as did the long green shoots of grass trees, emerging from their blackened, pineapple-shaped trunks. These trees are pyrophytic—they thrive after fires.

In Parndana, a small agricultural town, I saw a handwritten sign outside a makeshift store offering free groceries to families affected by the fires. A newsletter posted in a gas station reported on wineries going under, tourism businesses destroyed, and burned buildings requiring asbestos cleanup. In a roadside café near Vivonne Bay, on the south coast, I found mental health pamphlets and notices of counseling services and depression hot lines for a community reeling from losses. An Australian Psycho-

logical Society handout was stacked on the counter: “Now, a few months after the fires, many people are feeling tired and stressed, and they know that their daily struggle isn’t going to be over any time soon.”

The news media’s fixation on the island as the fires raged has created a complicated legacy for any reporter who turns up a month or two later. I was aware of being viewed with distrust by locals who’ve felt justifiably used in the media storm’s sudden descent and then abrupt disappearance. The press attention, combined with social media’s refraction of certain stories into trend roller coasters, has had the undeniable upside of an outpouring of genuine sympathy and generosity. An effort to recruit 120 volunteers to set up food and water stations for wildlife throughout devastated areas, organized by Australia’s Royal Society for the Prevention of Cruelty to Animals, was inundated by more than 13,000 applications in a matter of days. Online crowdfunding has raised close to \$2.5 million for Kangaroo Island bushfire recovery. But there’s a downside, too: a trading in the suffering of others. In the midst of the fires, one foreign journalist demanded of a shellshocked local resident, “I want to see burnt animals, and where those two people died.”

THE SMITHSONIAN’S newest chief scientist is a koala expert. Meet her at [Smithsonianmag.com/koala](https://www.smithsonianmag.com/koala)



Utah Karran, 13, releases a recovered koala into an intact blue gum plantation. Karran and his sister and parents spent two months rescuing animals at risk.



< Rescuers placed vegetables in devastated areas to feed animals. Some 13,000 people applied for 120 openings for volunteers to distribute food and water. --

wildlife, to say nothing of the divide between locals and outsiders.

In every conversation, whether with a lodge manager, the owner of a feed business, or at the corner-store café, people wanted me to know that they're upset about the way resources were being distributed. Special anger was reserved for rogue operators who have raised huge amounts of cash for wildlife work on the island, but with no real right to be there. Many singled out a Japanese outfit, reportedly run by a guy who turned up on the island with good intentions but zero clue. He had

set himself up in a house in Kingscote, the island's largest town (pop. around 1,800), and without coordinating with any recognized wildfire rescue operations was bringing in koalas from the wild that were healthy and didn't need rescuing. Yet he had raised a small fortune through his organization's website, from good people donating to the wrong cause. One islander told me, "I never realized disaster would be like this. At first, everyone helped. Then it got scary. It became about money, fame, randoms making an absolute killing."

KANGAROO ISLAND was given its modern name by the British navigator Matthew Flinders, who sailed the HMS *Investigator* to its shores in March 1802. The island was then uninhabited, but archaeologists later found stone tools and other evidence that ancestors of modern Aboriginal Tasmanians lived there thousands of years ago, at least until the



The immediate compassionate response of people pulling together in a crisis is now wearing thin. Tendrils of suspicion are snaking their way through the community, as locals assess the distribution of government and crowdfunded resources. Almost everybody has their heart in the right place, but the reality is that these decisions are political and contested. Old divides are widening—between, say, stock farmers in the Heartlands and those motivated to protect the island's unique

island was cut off from the mainland, and possibly afterward. Rebe Taylor, a historian, writes that the Ngarrindjeri people of the coast opposite Kangaroo Island call it the "land of the dead," and have a creation story about rising seas flooding a land bridge to the island.

Flinders and his men were amazed to find kangaroos—a subspecies of the mainland's western greys—that were so unused to humans that they "suffered themselves to be shot



Oliver Funnell, a veterinarian at Zoos South Australia, and veterinary nurse Donna Hearn attend to an injured koala at the Wildlife Park.



in the eyes,” Flinders recalled in his expedition notes, “and in some cases to be knocked on the head with sticks.” In gratitude for this meat after four months without fresh provisions, he named it Kangaroo Island (misspelling his own). The French explorer Nicolas Baudin, sailing the *Géographe*, was disappointed not to have arrived before his English rival—their ships crossed paths as Flinders was leaving the island—but Baudin took 18 kangaroos with him, in the name of science. He made two of his men surrender their cabins to the animals in a bid to keep them alive. Baudin himself died from tuberculosis on the return journey, but some of the kangaroos survived, and they reportedly became part of the menagerie outside Paris owned by Napoleon’s wife, the Empress Josephine.

The recent fires killed as many as 40 percent of the island’s 60,000 or so kangaroos, yet worldwide attention has focused mostly on the fate of the koalas. At least 45,000 koalas, or some 75 percent or more of the island population, are thought to have died, and the crisis has revived an old controversy, with battle lines drawn anew between those who believe the koalas don’t deserve all the attention they’re getting and those who do.

Koalas have always had the species advantage of being considered cute, cuddly Australian icons, but they are not native to Kangaroo Island. They were introduced by wildlife officials only in the 1920s, from a breeding program on French Island, off mainland Victoria, with a founding population of fewer than 30 animals. The effort was an early attempt at conserva-

to save the few remaining Kangaroo Island dunnarts, or Tamar wallabies (which are almost extinct in mainland South Australia), or pygmy possums, or endangered glossy black-cockatoos, which mainly feed on the seeds of casuarina trees (many of the trees burnt), or Ligurian bees, introduced in 1885 and believed to be the species’ last genetically pure population in the world.

Island farmers, meanwhile, feel that wildlife has unfairly consumed all the attention when so many stock animals burned during the fires. Many local farming families are descended from soldier-settlers who were given parcels of land after each of the world wars, which they worked hard to make productive in difficult circumstances. (The island’s natural soil quality is so poor, and the lack of surface water so severe, that most British colonists backed by the South Australian Company who settled the island in 1836 left after just five months.)

One islander confided to me that, while he felt bad for the farmers, stock animals are “replaceable,” and often covered by insurance, but wildlife is not; and while it may seem from news media coverage that Australia cares about its wildlife, the government in fact has an appalling track record when it comes to protecting wildlife and biodiversity. “Australia is a global deforestation hotspot,” Suzanne Milthorpe, from the Wilderness Society Australia, told me. “We are ranked second in the world for biodiversity loss, and three unique animals have gone extinct in the last decade alone.

“These animals weren’t my responsibility, but nobody else was doing anything. The government wasn’t giving any direction.”



tion; habitat loss and hunters trading in their fur had driven koalas on the mainland to near extinction. Since then, the island had become overpopulated with koalas, which some people think are in danger of eating themselves out of house and home. In fact, since the late 1990s a government-run koala sterilization program has tried to stem population growth, not only for the koala population’s sake but also because the animals wreak destruction on native vegetation, including rough-bark manna gums, a type of eucalyptus that is key to preventing soil erosion, and paddock trees.

In addition, tens of thousands of koalas lived in eucalyptus plantations owned by a timber company with plans to harvest and export those trees; those animals would have to be moved eventually. Finally, the Kangaroo Island koalas are so highly inbred that some experts argue they may be of little use in bolstering northern Australia koala populations, which are classified as vulnerable.

Some wildlife advocates believe that preventing species extinction, or saving species that are endemic or unique to the island, should be the priority. They argue that funding would be better channeled toward specialists working

In comparison, the United States’ Endangered Species Act, which contains real protections against harm and habitat destruction, has been 99 percent successful at preventing extinction.” (Critics of American species conservation efforts point out that less than 3 percent of listed species have recovered sufficiently to be removed from protection.)

The koalas on Kangaroo Island were also fortunate in being able to be rescued at all; many were found sheltering high enough in the treetops to have escaped the flames. Hundreds were saved, treated and survived, and many were set free. Even young, orphaned koalas that must be bottle-fed and tended by hand would survive in captivity. By contrast, kangaroos and wallabies often couldn’t outrun the fires, and most of the rescued animals were badly burned and had little chance of recovery.

All of this helped me understand why legitimate, professional koala rescues on the island really do matter, and why the stakes feel so high for those who are skilled at and committed to this grueling work. For people desperate to help in the aftermath of the fires, rescuing and treating injured koalas and relocating koalas stranded in devastated forest areas



has become a kind of humane religion, something to cling to and thus avoid descending into despair. Each and every rescue becomes a small but holy and tangible act to stem the wider suffering.

AS SOON AS THE STORY BEGAN to circulate, during the fires, that the Kangaroo Island Wildlife Park, outside Parndana, had become the impromptu center for the emergency treatment of burned wildlife, the place was inundated with journalists. The largely open-air park, which was already home to 600 or so animals, including snakes, wombats, cassowaries and an alligator, is owned by Dana and Sam Mitchell, a couple in their late 20s who moved to the island in 2013, after meeting while working at a wildlife park in Victoria. Journalists turned up even as the fires were burning, sleeping uninvited on the floor of the park's café, barging into the Mitchells' house at all hours.

This, to be fair, had some positive outcomes. An Australian TV channel, for instance, arranged for a popular home renovation show to build a wildlife hospital in the park, and the Mitchells have raised more than \$1.6 million through crowdfunding to pay for professional veterinary costs, new buildings

▲ Kailas Wild, an arborist from Sydney who aided rescue efforts on the island, with a young kangaroo. He saved more than 100 koalas.

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for wildlife care, and an islandwide koala rescue and rehabilitation program.

Yet it was overwhelming, too. Dana had to evacuate twice with their toddler, Connor, during the peak of the fires, while Sam stayed with staff and other family members to defend the property; the park and its animals were spared only after the wind changed direction as the fires were bearing down.

Meanwhile, hundreds of injured wild animals were brought to the park by Army personnel, the State Emergency Service and firefighters. As the roads reopened, many locals also began to arrive with injured wildlife, unsure where else to take them. Since the start of January, more than 600 koalas have been brought to the park, though not all have survived. Kangaroos with melted feet and koalas with melted paws had to be put out of their suffering. Orphaned baby koalas, called joeys, arrived with ears or noses burnt off. There were severely dehydrated older koalas with kidney disorders, and possums and wallabies blinded by the heat. "We were having to make it up on the spot," Sam told me. "We were just a small wildlife park. These animals weren't my responsibility, but nobody else was doing anything. The gov-



Charred eucalyptus trees sport green epicormic growth—shoots emerging from cracks in the bark to give the trees another chance at life.



ernment wasn't giving any direction." In the first weeks, they operated a triage center out of a tin shed, with no power.

Sam and Dana soldiered on, and by now they have an impressive setup for koala rescue, treatment, rehabilitation and release. Behind their house is a series of brand-new buildings and dozens of koala enclosures, tended to by vets and veterinary nurses from Australia Zoo, Zoos South Australia, and Savem, a veterinary equivalent of Doctors Without Borders, as well as trusted local volunteers.

Sam has a grim sense of humor to help deal with the trauma of the past months, but he and Dana are physically and emotionally exhausted, as is everybody I met on the island. I felt bad asking them to retell their experiences during the fires, the ins and outs of how they survived, aware of the symbolic violence of being forced to perform your own private trauma for outsiders over and over again. Yet they did so, graciously, describing the unusual warning of white ash hitting the park even before the smoke. Desperate for sleep after staying awake several nights, Sam eventually brought a blanket outside and laid it on the grass, setting his phone alarm to go off every 15 minutes. He was worried that if he slept inside he wouldn't see the fire coming.

In spite of their fatigue, they welcomed me into the joey clinic one morning. Dana was in the middle of individually bottle-feeding some 15 baby koalas while also caring for Connor. He was toddling around holding a branch of acacia and following the family dog, Rikku, who is remarkably tolerant of human babies and a tiny kangaroo named Kylo that likes to practice its boxing on the dog's face. Staff and volunteers swirled in and out of the clinic, eating breakfast, getting medical supplies, asking about treatment plans. Dozens of rescued, slightly older joeys under 18 months old live in enclosures outside, since they no longer depend on milk, along with 30 older koalas with names like Ralph, Bonecrusher and Pearl; the number changes constantly as they recover enough to be released. Dana sat on a sofa cradling a baby koala they'd named Maddie, feeding it a morning bottle of Wombaroo, a low-lactose formula. When Maddie was rescued, she weighed just two pounds. "She had no burns when we found her," Dana said, "but also no mum."

Nearby sat Kirsten Latham, head keeper of Australia Zoo's koala program, holding 10-month-old Duke, who was swaddled in a towel. He was rescued in January with second-degree burns and was missing several claws—which are crucial for tree-climbing—and had to be fed with a syringe before he started taking the bottle. "You have to really concentrate when you're feeding them, as they can aspirate the milk when they're young," Kirsten said. "It helps to wrap them in a towel and keep a hand over their eyes, because when they're drinking from their mums they keep their heads tucked right into the pouch, where it's dark and quiet." These feedings are done three times a day, and it can take each person three hours to feed all the baby koalas during a mealtime.

IN THE CLINIC'S KITCHEN, I found Kailas Wild and Freya Harvey, both fit and sunburned, wearing black T-shirts and cargo pants. They were studying a map of the island's plantations and natural bushland, planning their next koala rescues. They are old friends and skilled climbers, and have been on the island for weeks, doing the dangerous work of climbing the tall,



burnt blue gum trees to reach koalas perched at the very top, sometimes as high as 80 feet.

Kailas is an arborist and volunteer for the State Emergency Service in New South Wales, and Freya is currently based in New Zealand, but they both dropped everything to go to Kangaroo Island as soon as they realized their tree-climbing skills could help save wildlife. Kailas drove the 900-odd miles from Syd-



ney to the ferry terminal in Cape Jervis in his pickup truck, sleeping in the back along the way, and bringing it across to the island on the ferry. It took them a little while to earn Sam's trust; his classic Australian suspicion of "blow-ins" has been compounded by having been let down by others who turned up offering help but haven't followed through. But now that they have it, I can see the three of them have formed a close-knit

^ California wildlife rescuer Douglas Thron and environmentalist Freya Harvey launch a drone outfitted with an infrared camera to spot stranded koalas. --

team, daily coordinating koala rescues and treatment.

The ground rescue crew that Kailas and Freya have been working with is a local family of four: Lisa and Jared Karran and their children, Saskia and Utah. They live near Kingscote, where Jared is a police officer. They've spent almost every day since the fires out in the bush rescuing animals. At first, the ground was so hot it was smoking, and they had to wear special boots

so the soles didn't melt. Now the risk is falling trees. They work up to 12 hours a day, the kids uncomplaining and involved, outfitted with gloves and hard hats, handling the koalas like pros, and accompanying Jared for long drives at the end of each day to release rehabilitated survivors into a distant unburned plantation. As of last count, they've helped rescue 143 koalas.

Outside the clinic, in a nearby field, a Robinson R44 helicopter had just landed after an aerial survey using a thermal-imaging camera to locate koalas by detecting their body heat; this is one of several ways that Sam and the rescue team are now experimenting with technology to find where koalas are clustered and whether those habitats are burned or still viable. Sam was paying a lot to rent the helicopter, and the results have been promising, but Sam is still learning how to operate the infrared camera from the air—it's no easy feat to adjust the focus and pan-and-tilt speed while fine-tuning koala heat signatures from inside a moving helicopter—and the data is complicated to interpret.

At this phase of the recovery effort, the goal is no longer strictly to rescue injured koalas and get them to the hospital for treatment. The team is also trying to figure out if koalas remaining in the wild have enough food to survive. The fear is there will be a second wave of koala deaths, from starvation. The team is also experimenting with drones, and Thomas Gooch, founder of a Melbourne environmental analytics firm called the Office of Planetary Observations, has donated recent satellite-observation maps that display vegetation cover to identify areas that have burned.

identify ten koalas in one section of a burnt eucalyptus plantation. Today, it would be up to the ground rescue team to head out and see what they could find by daylight.

"WE WERE CALLING IT POMPEII," said Lisa Karran as we drove past a tragic tableau of carbonized Tammar wallabies huddled in a clearing beside rows of burnt blue gums. The hardest part, she said, was seeing the incinerated family groups together—baby koalas holding onto branches beside their moms, dead possums and kangaroos with their young beside them.

Standing amid rows of charred trunks, Utah, who is 13, was readying the koala pole—an extendable metal pole with a shredded feed bag attached to the end, which the climbers shake above the koala's head to scare it down the tree. Saskia, who is 15, held the crate at the base of the tree. Jared had spotted this particular koala—"because I'm koalified!" he joked—curled right at the top of a black trunk with no leaves.

The luminous epicormic growth was sprouting from many of the trunks around us. The rescue team had begun to wonder if this growth, which is known to be more toxic than mature leaves, as the tree's natural defense against insects and animal browsing while the tree itself struggles to survive, might be making the koalas sick. Some of the koalas they'd seen eating it, and had subsequently brought in for treatment, had diarrhea or gut bloat. They'd also observed koalas eating dead leaves rather than epicormic growth, suggesting the animals may not find it

The hardest part was seeing the **incinerated family groups** together—baby koalas holding onto branches beside their moms.



A newer member of the koala rescue team is Douglas Thron, an aerial cinematographer and wildlife rescuer from Oakland, California, who was brought to the island by Humane Society International. In the 1990s, Thron used to take politicians and celebrities up in a little Cessna to show them the impact of clear-cutting old-growth redwood forests in California. Last year, he spent months after California's devastating fires, and in the Bahamas after Hurricane Dorian, using a custom-made drone to spot dogs and cats trapped in the debris.

Douglas had been on the island since late February, using his drone—configured to carry an infrared camera and a 180x zoom lens and spotlight—to help the team identify where in the vast acreage of burnt blue gum plantations there were koalas needing rescue or resettlement. So far, he had spotted 110, of which 60 had been rescued.

Douglas, Kailas and Freya had spent most of the previous night in the bush, using the drone to do thermal imaging and closer spotlighting of the treetops in the darkness, when it's easier to see the koalas' heat signatures. From the ground, Douglas used a video screen attached to the drone controls to

an ideal food source. Koalas are naturally adapted to the toxins in eucalyptus leaves, with gut flora that help digest the leaves and flush out the toxins. But the higher toxicity levels of the new growth may be beyond their tolerance. Ben Moore, a koala ecologist at Western Sydney University, said that there are no detailed studies that directly compare the chemical makeup of epicormic growth with adult leaves, but he hypothesized that any dramatic change in a koala's diet would change that individual's microbiome, and in turn affect its gut function.

In recent weeks, the group has rented a mechanized crane, which makes it easier to get to the tops of the trees, but there are still many rescues where the koala is so high up that Freya or Kailas need to clip in and use the arborist's technique of throwing a weight and line to climb the burnt and brittle trees, and then shake the koala pole above the animal's head. Typically, a koala grunts or squeals and climbs down a trunk amazingly fast. After Lisa or Utah plucks it off the trunk at the bottom and places it in a crate, it becomes surprisingly docile, gazing up at its human saviors.

The first koala rescued that day was underweight, and oth-



ers had pink patches on their feet signaling healing burns, but some were healthy enough, the group decided, to be released elsewhere without needing to be checked by vets at the Wildlife Park.

Hours and hours passed like this in the hot plantations. It was gripping to watch. Each rescue had a unique emotional texture—a dramatic arc of growing tension as those on the ground waited for the climbers to encourage the koalas down, the adrenaline spike of grabbing the animals behind their strong necks and getting them into the crate, and the communal relief if they were found to be healthy. Each of the ten koalas rescued that day was found almost exactly where Douglas’s drone had spotted them the night before.

During one rescue, a koala kept up a plaintive high-pitched wail but would not budge from its perch. Freya and Kailas both had to clip in and climb up in order to coax it down. Once on the ground the team knew this koala was seriously unwell: its paws were covered in fresh blood, from the loss of several claws—a sign of previous burns or infections. Kailas, in particular, was devastated, and sobbed openly. They knew from experience what fate awaited this koala. Later that night, after its condition was checked at the Wildlife Park, it was euthanized.

▲ Out of the hundreds of koalas that volunteers and staff have rescued, many are being raised in captivity. Older koalas are released into intact eucalyptus plantations.
--

The next day, Kailas made his 100th rescue. It also happened to be Jared’s last day doing rescues with his family. The next Monday, he’d be back at work as a police officer. “There’ll be criminals robbing the bank, and I’ll be gazing up into the trees, looking for koalas,” he said wistfully. He’d been scrolling back through his photos, and had been struck by a picture of Saskia and Utah swimming in the sea the day before the fires started, two months before. “Every day since, it’s just been so different,” he said. “I was thinking this morning that I want to get back to that.”

At dusk, the Karrans drove out to one of the only plantations that didn’t burn, called Kellendale. They had six healthy koalas in the back seat and the trunk of their SUV, rescued from plantations with no leaf cover for food. After the eerie silence of another long day spent in burnt plantations—not a single insect hum or bird song—it was a joy to see a flash of pink from the belly of a rose-breasted cockatoo, and to hear the soft, wavelike rustling of living eucalyptus leaves in the breeze. It felt like paradise.

Utah and Saskia released the koalas from their crates one by one, and the family laughed together as one of their feistiest rescues, a female koala with lovely fluffy ears, sprinted for a tree, climbed about 15 feet up, then stopped and stared back down at the humans for a good long while. Then she climbed higher, cozily wedged herself in the fork of a branch, and held on tight as the narrow trunk rocked in the wind. ♦

BYLINES

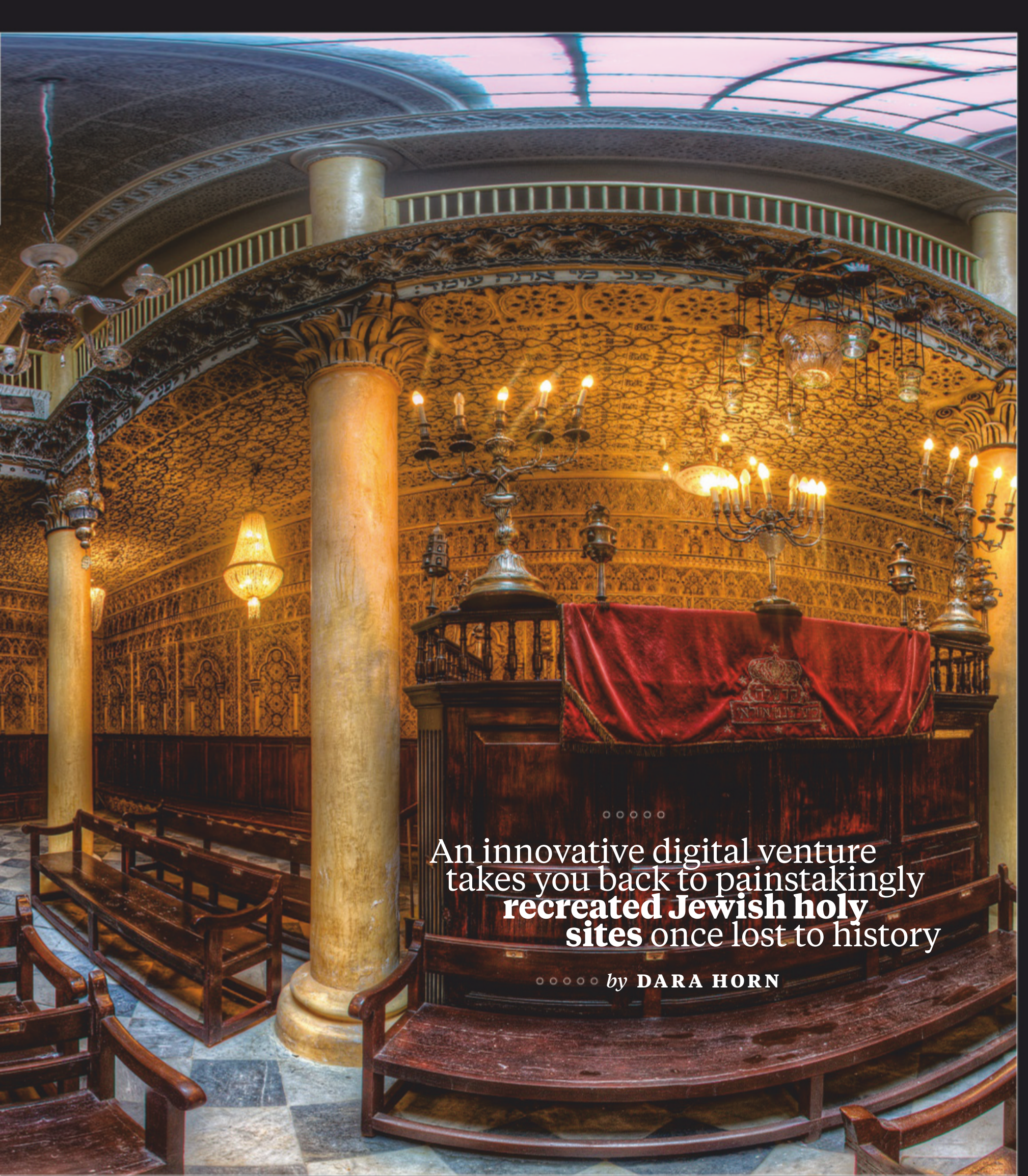
The journalist and novelist **Ceridwen Dovey** has written for *Wired*, the *New Yorker*, and more. Sydney-based **David Maurice Smith** photographed the repatriation of Mungo Man for *Smithsonian*.

Return to



Moshe Nahon Synagogue in Tangier, Morocco. This is a flattened view of a 360-degree photograph from Diarna's archives. Similar photos appear on Pages 72-75.

o o o o o



.....
An innovative digital venture
takes you back to painstakingly
recreated Jewish holy
sites once lost to history

..... by DARA HORN

the Sacred

o o o o o



< The ruins of the Eliyahu Hanavi-Jobar Synagogue in Damascus, Syria, after it was looted and then bombed in the Syrian civil war in 2014.



IN A NARROW STREET in Damascus, one of the oldest cities in the world, I pull open a heavy iron door in a cinderblock wall and enter an ancient synagogue. Behind the door, just past a tiled courtyard shaded by a large tree, I am stunned by what I see.

I'm standing inside a jewel box. The small room is illuminated by dozens of elaborate beaded chandeliers; its walls are covered with thick red velvet draperies, its stone floor with richly patterned carpets. In front of me is a large flat stone topped with a golden menorah: Here, an inscription informs me, the Hebrew prophet Elijah anointed his successor Elisha, as described in the biblical Book of Kings.

For a place that drew Jewish pilgrims for centu-

ries, it is remarkably well preserved—and startlingly intimate. There are no “pews” here; instead, there are low cushioned couches facing each other, as though this were a sacred living room. A raised marble platform in the center has a draped table for public Torah readings; at the room’s far end is an ornate wooden cabinet filled with ancient Torah scrolls, their parchments concealed inside magnificent silver cases. On the walls are framed Hebrew inscriptions, featuring the same prayers my son is currently mastering for his bar mitzvah in New Jersey.

I should mention here that I’ve never been to Damascus. Also, this synagogue no longer exists.

I’m using a virtual platform called Diarna, a Judeo-Arabic word meaning “our homes.” The flagship project of the nonprofit group Digital Heritage Mapping, Diarna is a vast online resource that combines traditional and high-tech photography, satellite imaging, digital mapping, 3-D modeling, archival materials and oral histories to allow anyone to “visit” Jewish heritage sites throughout the Middle East, North Africa and other places around the globe.

The idea of taking online tours isn’t so novel these days, now that the coronavirus pandemic has shifted so much tourism online. But Diarna is no gee-whiz virtual playground. The places it documents are often threatened by political instability, economic hardship, authoritarianism and intolerance—and in many cases, Diarna’s virtual records are all that stand between these centuries-old treasures and total oblivion.

> The sanctuary of Eliyahu Hanavi-Jobar in 2010. One tradition holds that it was built on top of a cave where the prophet Elijah hid from persecution and spoke to God.

> Texts on the synagogue wall in Hebrew and Aramaic include lines from Psalm 144:15: “Blessed the people who are so favored, blessed the people whose God is the Lord.”

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That synagogue I visited, the Eliyahu Hanavi-Jobar Synagogue in Damascus, was documented by one of Diarna's photographers before 2014, when Syria's civil war transformed the 500-year-old site to rubble—photos of which you can also find on Diarna. The implications of this project are enormous, not only for threatened Middle Eastern minorities, but for all of us. It has the power to change the very nature of how we understand the past.

Diarna is the brainchild of Jason Guberman-Pfeffer, then a recent graduate of Sacred Heart University active in Middle Eastern human rights circles, and Fran Malino, then a Wellesley College professor studying North African Jewish history. In 2008, a mutual acquaintance of theirs traveled to Morocco to explore his wife's family's Moroccan-Jewish roots, and he found that many of the places he visited—synagogues, schools and cemeteries—were startlingly decayed. And the elderly people who remembered the places best were dying off. Malino and Guberman-Pfeffer put their heads together and realized their untapped power: By combining their archival skills, their contacts in the region and newly available technologies like Google Earth, they could preserve these places forever.

"It morphed almost immediately into this huge project," remembers Malino, who is now Diarna's board president and the head of its nonprofit parent company, Digital Heritage Mapping. Malino began by recruiting among her own students, but was soon startled by how many young people—including American photographers and budding scholars, and also people on the ground in North Africa—signed on. "In very short order with a very small budget, we had a number of people working for us so we could set up a website and accumulate a lot of information and photos."

More than a decade later, with Guberman-Pfeffer as its project coordinator, Diarna has run over 60 field expeditions, sending photographers and researchers to collect information and visual evidence of the remains of Jewish communities, and the organization has now documented nearly 3,000 sites throughout the Middle East and North Africa, as well as elsewhere in the world. Starting with an interactive map of the world, anyone can zoom in and explore them all. Some of these locations include little more than a town's name and basic information about its Jewish history, with research still in progress.

But many include beautiful photography showing physical sites from many angles, bibliographies of historical resources, and oral histories from former Jewish residents describing

lives lived in these places. Other sites are being documented in ways unimaginable even just a few years ago. Today, Diarna's photographers, researchers and volunteers are using tools like a portable 360-degree camera that creates a fully immersive view of a building's interior, drone photography for bird's-eye views of ancient ruins, and design software that can turn traditional photography into vivid 3-D models.

Social media has also made it possible, even easy, to collect amateur photos and videos of places otherwise inaccessible, and to locate those who once lived in these Jewish communities. Diarna's interactive map often includes links to these amateur videos and photos when no others exist, giving people a window on sites that are otherwise invisible.

And as former Jewish residents of these places age beyond memory's reach, Diarna's researchers are conducting as many in-person interviews with such people as they can, creating a large backlog in editing and translating these interviews to make them accessible to the public. The oral histories currently available on the site are a tiny fraction of those Diarna

"In my mind the goal is to make available to all of us, whether they're in ruins or not, the richness of those sites."



Fran Malino first learned about the Middle East from her father, a Reform rabbi known for his pacifism.

has recorded and will eventually post. "We're in a race against time to put these sites on the map," Guberman-Pfeffer says, "and to preserve these stories before they're forever lost."

I'VE BEEN THINKING about time and loss since I was 6 years old, when it first dawned on me that people who die do not ever return—and this was also true for each day I'd ever lived. As a child I would often get into bed at night and wonder: The day that just happened is gone now. Where did it go? My obsession with this question turned me into a novelist, chasing the possibility of capturing those vanished days. Inevitably these efforts fail, though I stupidly keep trying.

When I first learned about Diarna, I was a bit alarmed to discover an entire group of people who not only share my obsession but are entirely undeterred by the relentlessness of time and mortality—as if a crowd of chipper, sane people had barged into my private psych ward. The bright, almost surreal hope that drives Diarna is the idea that, with the latest technology, those lost times and places really can be rescued, at least virtually, from oblivion. It's a little hard to believe.

Jews have lived throughout the Middle East and North Af-



◀ When Jason Guberman-Pfeffer saw that a college textbook had just one paragraph about Jewish history in the Middle East and North Africa, it piqued his interest.

◉ ◉ ◉ ◉ ◉

Today, people and governments have varying attitudes toward the Jewish communities that once called these countries home. Morocco publicly honors its Jewish history; there, the government has supported Jewish site maintenance, and Diarna cooperates with a nonprofit called Mimouna, a group devoted to documenting Jewish life. In other places, there is public denigration or even denial of a Jewish past. In Saudi Arabia, decades of pan-Arabist and Islamist propaganda have left the public ignorant that Jews still lived in the kingdom after the Islamic conquest, despite recent official efforts to recognize the kingdom's remarkable Jewish historical sites. Diarna researchers have been making plans to travel to Saudi Arabia to explore ruins of once-powerful ancient Jewish cities.

In some places, abandoned synagogues have been transformed into mosques; in others, tombs of Jewish religious figures or other sacred spaces are still being maintained, or even revered, by non-Jewish locals. More often, especially in poor rural areas where land is worth little and demolition costs money, abandoned Jewish sites are simply left to decay. Many, many photos on Diarna show derelict cemeteries with

toppled gravestones, synagogues with the second story and roof caved in, holy places in the process of returning to dust.

rica for thousands of years, often in communities that long predated Islam. But in the mid-20th century, suspicion and violence toward Jews intensified in Arab lands. Nearly a million Jews emigrated from those places. In some instances, like Morocco, the Jewish community's flight was largely voluntary, driven partly by sporadic anti-Jewish violence but mostly by poverty and fear of regime change. At the other extreme were countries like Iraq, where Jews were stripped of their citizenship and had their assets seized. In Baghdad, a 1941 pogrom left nearly 200 Jews dead and hundreds of Jewish-owned homes and businesses looted or destroyed.

Diarna is officially apolitical, refusing to draw conclusions about any of this—which for a novelist like me is maddening. I want the past to be a story, to mean something. So do lots of other people, it turns out, from Zionists to Islamic fundamentalists. Guberman-Pfeffer politely declines to engage. “It’s not our job to give a reason why this particular village doesn’t have Jews anymore,” he tells me. “We just present the sites.” Malino, as a historian, is even more rigorous in defending Diarna’s neutral approach. “In my mind the goal is to make available to

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< A computer model of Dar Bishi Synagogue in Tripoli, Libya. The city had more than 40 synagogues in the early 1900s. Dar Bishi was among the most ornate.

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The effect is **like seeing a beloved dead relative** in a dream. The past is alive, trembling within the present.

all of us, whether they're in ruins or not, the richness of those sites, and to preserve the wherewithal of accessing that information for the next generation. We are not taking a political position, not trying to make a statement. Absolutely not."

Every Diarna researcher I talked to stood firm on this point. But the choice to present these Jewish sites is itself a statement, one that underscores an undeniable reality. "The Middle East is becoming more homogeneous," says Diarna's lead research coordinator, Eddie Ashkenazie, himself a descendant of Syrian Jews. "We're pointing out that the store next to your grandfather's in the market was once owned by the Cohen family," he tells me. "Whether they got along or it was fraught with tension is going to vary depending on the time and place, but it testifies to a society that had other voices in it, that had minorities in it, that was heterogeneous. Today you have whole societies that are only Libyan Muslims, or only Shiite Arabs. But they used to be incredibly diverse. All Diarna is trying to do is say that Jews once lived here."

BYLINES

Dara Horn is a scholar of Hebrew and Yiddish and the author of five novels, two of which won the National Jewish Book Award for Fiction.

"**WE ARE REWRITING** the history books," Ashkenazie says, and then corrects himself: "Not *rewriting*; we're just writing this history, period. Because no one else has yet."

Over the phone, Ashkenazie walks me through an elaborate PowerPoint presentation that spells out exactly how Diarna does its current work. He tells me about the Libyan town of Msellata, where a former Jewish resident, interviewed by one of Diarna's researchers, mentioned that the synagogue was once located "near the police station." On-screen, Ashkenazie shows me how he used the mapping tool Wikimapia to find the town's police station and calculate a walking-distance radius around it.

Next came diligence plus luck: While he was scouring Libyan social media, he came across an archival photo that a current Msellata resident happened to post on Facebook, which clearly showed the synagogue across the street from a mosque. Ashkenazie then identified the still-standing mosque from satellite photos, thereby confirming the synagogue's former location. "What you don't see are the hours of interviews before we got to the guy who mentioned the police station," Ashkenazie

> A service at Dar Bishi when Libya was under Italian rule. The congregation thrived until the 1940s, when deportations and pogroms prompted a mass exodus.

> Garbage now litters the synagogue floor and bricks cover the space where the ark—which housed the congregation's Torah scrolls—once stood.

o o o o o



says. “It’s the work of ants. It’s very tedious, but it works.”

I find myself wondering what moves people to do this “work of ants.” My own great-grandparents, Jewish immigrants from Eastern Europe at the turn of the last century, wanted at all costs to forget the “old country”; this was true for many Middle Eastern Jewish refugees as well, especially those with bitter memories of societies that turned on them. Ashkenazie admits that many of Diarna’s interviewees—mostly elderly Israelis—are baffled as to why anyone would care about the street corner where their synagogue once stood, and they have to be convinced to sit down with his researchers.

The disappearance of these communities is, in fact, just an acute (and sometimes violent) version of what eventually happens to every community, everywhere. All of us will die; all of our memories will be lost. Today it’s a synagogue in Tunisia that’s crumbling; eventually the sun will explode. Why even try?

These questions haunt me as I sift through Diarna’s site, along with several unedited interviews that Ashkenazie shared with me: a man describing Yom Kippur in rural Yemen, a woman detailing the Tomb of Ezra in Iraq, a man recalling the Hebrew textbooks he studied in Cairo. The speakers in these videos are deeply foreign to me, elderly people with Arabic accents describing daily lives I can barely imagine. Yet they often mention things I recognize: a holiday, a biblical figure, a prayer, a song.

It occurs to me that Jewish tradition, like every tradition, is designed to protect against oblivion, capturing ancient experiences in ritual and story and passing them between generations. Diarna is simply a higher-tech version of what everyone’s ancestors once did—pass along memories around a fire—but with new technologies expanding that warm, bright circle.

In one video interview, not yet online, an elderly man speaks in Arabic-accented Hebrew about his hometown of Yefren in Libya. Up the hill from his family’s branch-ceilinged stone house, he says, was the tiny town’s 800-year-old synagogue and adjoining ritual bath. As he sits with a Diarna researcher at his kitchen table in Israel, he scribbles maps and floor plans, describing the synagogue with its interior arches, its columns, its holy ark for Torah scrolls. Listening to this man’s rambling voice is like hearing someone recount the elaborate details of a dream.

Which is why it is utterly unnerving to click on the town of Yefren on Diarna’s interactive map and find a recent YouTube clip by a traveler who enters the actual physical ruins of that very synagogue. The building is a crumbling wreck, but its design is exactly as the Israeli man remembered it. I follow the onscreen tourist in astonishment as he wanders aimlessly through the once-sacred space; I recognize, as if from my own memories, the arches, the columns, the alcove for the Torah scrolls, the water line still visible in the remains of the ritual bath. The effect is like seeing a beloved dead relative in a dream. The past is alive, trembling within the present.

“There is a deeply pluralistic religious and cultural history in Iraq. We’ve offered training and assistance to Iraqi colleagues as they document parts of **Iraq’s diverse past**, such as the Jewish quarters of the old cities.”

—Katharyn Hanson, Secretary’s Scholar, Smithsonian’s Museum Conservation Institute



THE PROBLEM IS THAT Diarna’s ants are often working on top of a live volcano. This is a region where ISIS and other groups are hellbent on wiping out minorities, where political upheaval has generated the greatest human migration stream since the end of World War II, and where the deliberate destruction of priceless cultural artifacts sometimes happens because it’s Wednesday.

Mapping sites in this environment can require enormous courage—the hatred that prompted the Jews’ flight has long outlived their departure. Libya is one of many societies where Jews were violently rejected. Tripoli was more than 25 percent Jewish before World War II, but in 1945 more than a hundred Jews in the city were murdered and hundreds more wounded in massive pogroms, prompting the Jewish community’s flight.

Later, the dictator Muammar al-Qaddafi expelled all remaining Jews and confiscated their assets. In 2011, after Qaddafi’s ouster, a single Libyan Jew who returned and attempted to remove trash from the wreckage of the city’s Dar Bishi Synagogue was hounded out of the country by angry mobs waving signs reading “No Jews in Libya”; apparently one was too many.

Earlier that year, a journalist in Tripoli offered to provide Di-



arna with photos of the once-grand Dar Bishi. “She slipped her minders and broke into the synagogue, which was strewn with garbage, and took pictures of it all,” Guberman-Pfeffer told me of the reporter. “Qaddafi’s men caught up with her and confiscated her camera—but the camera was the decoy, and she had pictures on her cellphone.” From her photos, Diarna built a 3-D model of the synagogue; the reporter still refuses to be named for fear of repercussions. Other Diarna researchers have resorted to similar subterfuges or narrow escapes. One Kurdish journalist who helped document Iraqi Jewish sites had to flee a poison gas attack.

Even those well beyond war zones often feel on edge. As I spoke with Diarna’s researchers—a mix of professionals, student interns and volunteers—many of them warily asked to let them review any quotations, knowing how haters might pounce on a poorly worded thought. One photographer, who cheerfully told me how he’d gotten access to various Diarna sites by “smiling my way in,” suddenly lost his spunk at the end of our conversation as he requested that I not use his name. If people knew he was Jewish, he confided, he might lose the entree he needed for his work.

“There’s a lot of blood, sweat and tears to get these images out to the public,” says Chrystie Sher-

▲ The Fez Jewish cemetery. Jews arrived in Morocco after the Siege of Jerusalem in A.D. 70. Another wave came after the Spanish Inquisition.



man, a photographer who has done multiple expeditions for Diarna and who took the pictures of the destroyed synagogue in Damascus. Sherman was documenting Tunisian sites in 2010 when she decided on her own to go to Syria, despite rumblings of danger. “I was terrified,” she remembers. “I left all of my portrait equipment with a friend in Tunis, and just took my Nikon and went to Damascus and prayed to God that I would be OK.”

Following a lead from a Syrian woman in Brooklyn, she went to the country’s last remaining Jewish-owned business, an antiques shop in Damascus. The owner took her with other family members to the synagogue, which was no longer used for worship—and where his elderly father, remembering praying there years earlier, sat in his family’s old seats and broke down in tears. At another synagogue, Sherman was followed by government agents. “They asked why I was there, and I just told them I was a Buddhist doing a project on different religions. I didn’t tell them I was Jewish. You have to think on your feet.”

Sherman’s photographs for Diarna are incandescent, interiors glowing with color and light. Even her

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pictures from rural Tunisia, of abandoned synagogues in states of utter ruin, radiate with a kind of warmth, a human witness holding the viewer's hand. "It's hard to describe this feeling, which I have over and over again," she says of her work for Diarna. "You are seeing centuries of Jewish history that have unfolded, and now everything—well, the world has just changed so dramatically and a lot of things are coming to an end. I was only in Syria for five days, and I was so excited to return with my portrait equipment. But then the Arab Spring began, and I couldn't go back."

YOU CAN'T GO BACK. No one ever can. But it's still worth trying.

Because of Diarna, I see my own American landscape differently. I pass by the tiny colonial-era ceme-

▲ The Em Habanim Synagogue near Fez, Morocco. Its name, taken from Psalm 113, means "mother of children." The synagogue no longer has a congregation.



tery near my home with its Revolutionary War graves, and I think of the histories that might lie unseen alongside the ones we enshrine, wondering whether there might be a Native American burial ground under the local Walgreens, whether I am treading on someone else's ancient sacred space. I know that I must be. We are always walking on the dead.

Yet something more than time's ravages keeps me returning to Diarna. As I was researching this essay, I found myself reeling from yet another anti-Semitic shooting in my own country, this one at a kosher market 20 minutes from my home—its proximity prompting me to hide the news from my children. A few days later, my social media feed was full of pictures from a different attack, at a Los Angeles synagogue where someone—whether hatefully motivated



“I told them I was a Buddhist doing a project on different religions. I didn’t tell them I was Jewish. **You have to think on your feet.**”

or simply unstable—trashed the sanctuary, dumping Torah scrolls and prayer books on the floor. The pictures remind me of Sherman’s jarring Diarna photos of a ruined synagogue in Tunisia, its floor strewn with holy texts abandoned in piles of dust. Our public spaces today, online and off, are often full of open derision and disrespect for others, of self-serving falsehoods about both past and present, of neighbors turning on neighbors. It’s tough these days not to sense an encroaching darkness. I’m looking for more light.

“It’s hard to recognize other viewpoints if you’re in a bub-

ble where everyone thinks like you,” Ashkenazie tells me. He’s talking about homogenized societies in the Middle East, but he could be talking about anywhere, about all of us. “By raising this Jewish history, we’re puncturing these bubbles, and saying that in your bubble at one time not long ago, there once were others with you,” he says. “It’s not so crazy to welcome others.”

It’s not so crazy. I look through the images of our homes, all of our homes, the windows on my screen wide open. And I lean toward those sparks of light, glowing on a screen in a darkening world. ♦

Skateboard

CONTINUED FROM PAGE 17

line of boards, and his sponsors' financial support dried up. He sold his house, edited surf videos to make ends meet and flew to contests overseas on his own dime. That was the best-case scenario for boarders of the era: Two of Hawk's biggest 1980s rivals, the young stars Christian Hosoi and Mark Rogowski, went to prison for drugs and murder, respectively. Others died or vanished the way skateboarding seemed to do every ten years.

In the 1990s, skateboarding made yet another comeback—and achieved a new level of visibility with the first X Games, in June 1995. By the 1997 X Games, 198 countries were watching, and the following year Tony Hawk the skater would become Tony Hawk the “Got Milk?” spokesman. At the 1999 X Games, he made international headlines for the first 900-degree spin (2.5 rotations). Soon after, he co-founded USA Skateboarding and began lobbying the International Olympic Committee (IOC) to ask: If snowboarding was an event, why not skateboarding? Hawk championed the cause for 15 years, and Olympic skateboarding demonstrations finally began at the 2014 Youth Olympic Games; two years later, the IOC greenlighted skateboarding as an event in the 2020 Tokyo games (now postponed until 2021 amid the Covid-19 pandemic).

Skateboarding remains an American anomaly. It was born here, died here and then came back—again and again and again. In its 60 years, it has been viewed as a menace, an art form and now, finally, a noble athletic pursuit recognized at the highest level of international sports.

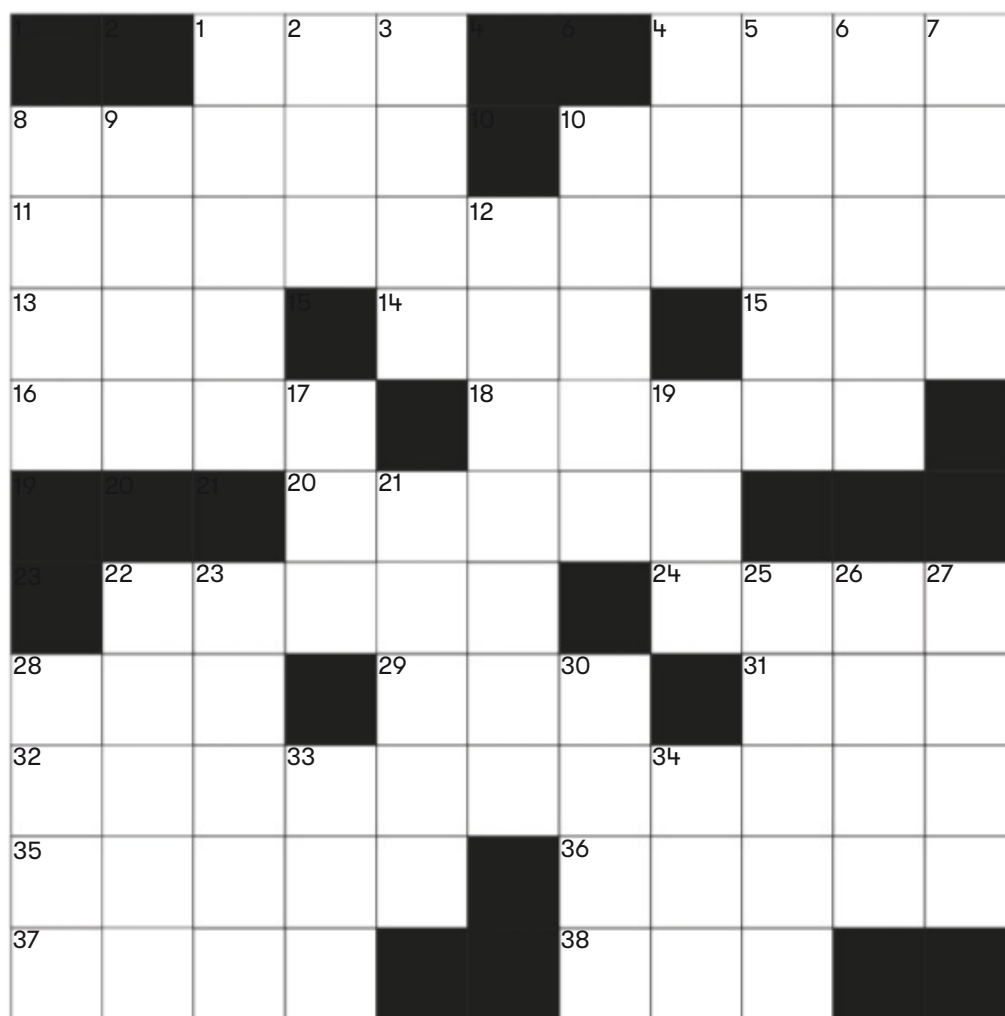
“In its early days, skateboarding was considered a sport for misfits and outsiders,” Hawk tells me. “We didn’t mind the label, since we weren’t trying to fit in with mainstream culture anyway.” And even as mainstream culture prepares to embrace skateboarding more enthusiastically than ever before, Hawk says, “I believe our sense of counterculture and individualism will shine through.” ♦

WATCH TONY HAWK'S last ride on his first skateboard at [Smithsonianmag.com/tonyhawk](https://www.smithsonianmag.com/tonyhawk)

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By Sam Ezersky



Across

- 1 Have the gift of ____
- 4 Something proudly displayed by King Philip as a symbol of courage
- 8 France's historic Musée de l' ____
- 10 Digging tool
- 11 Summer Olympics items beginning in 2021
- 13 Gotham City symbol's shape
- 14 Grp. that raided Berlin on Jan. 30, 1943
- 15 ____-weekly (newspaper type)
- 16 Skin surgery target
- 18 Seven, in Spanish
- 20 Book that Alexander the Great kept close throughout his conquest of Asia
- 22 Pyromaniacal crime
- 24 Valley of the Gods locale
- 28 Relative of an ostrich
- 29 “And ____, here we are!”
- 31 Losing tic-tac-toe line
- 32 Theoretically resistant to devastation, as Australian flora
- 35 Twist out of shape
- 36 Subject of a Kangaroo Island rescue
- 37 Like many landmarks virtually recreated by Diarna
- 38 Dragon roll ingredient

Down

- 1 Exams for M.B.A.s-to-be
- 2 Qty.
- 3 What's covered in the magazine *Zymurgy*
- 4 Place to get a mud facial
- 5 Rock standard?
- 6 Confuse
- 7 Take a quick breather
- 8 Global finance giant whose first initial stands for “Hongkong”
- 9 Not bad, but not great
- 10 Bulgaria's capital
- 12 Bowl-like in structure
- 17 “____ the season . . .”
- 19 School web address ender
- 21 Faithful
- 22 Kind of acid in proteins
- 23 Like areas with spotty cell service, maybe
- 25 Bottom number on a receipt
- 26 Figure skater's jump
- 27 “Today” co-host Kotb
- 28 Letters after D
- 30 Seize, as the throne
- 33 Suffix with mock or trick
- 34 “The Raven” poet

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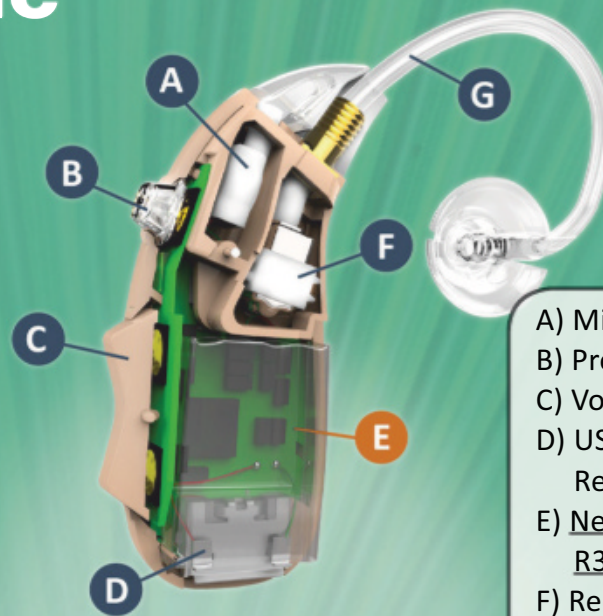
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Q: I read in Susan Orlean's *The Library Book* that libraries fumigated books for public health reasons. Do they still do that?

Carol Frank | Los Angeles

THAT PRACTICE was used in the late 19th and early 20th centuries, when book-borrowing was seen as a possible disease vector. Today, collections use nonchemical methods, like freezing, to treat mold and insect infestations. The observation that the coronavirus can survive on paper and cardboard for up to one day is leading libraries to disinfect nonporous surfaces and quarantine recently circulated materials for 24 hours, says Vanessa Haight Smith, the head of the Smithsonian Libraries' Preservation Services Department.

Q: Given the science of plate tectonics, can we predict what the continents will look like in, say, 100 million years?

Claire Bugos | Chicago



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SCIENTISTS ARE actually able to predict even further out—to about 250 million years. Although a tectonic plate moves very gradually, at about the rate a fingernail grows, and the movements of the various plates are complex, scientists can still estimate how those vast pieces of the Earth's crust will rearrange, explains Ed Venzke, a volcanologist at the National Museum of Natural History. For example, in 50 million years, Africa will move so far north that the Mediterranean Sea will disappear, and 100 million years in the future, Europe, Asia and Australia will all be stuck together. Christopher Scotese at the Paleomap Project has predicted the formation of Pangea Proxima, a supercontinent that will be created when a combined North and South America eventually collide with Africa.

Q: Did painters living during the 1918 influenza pandemic portray the experience?

Chase Carter | Washington, D.C.

SOME, BUT NOT MANY, documented their personal experiences with influenza: In 1918, the Austrian artist Egon Schiele sketched his wife, Edith, and his mentor Gustav Klimt, both of whom succumbed to the flu. Schiele died from it soon after. In 1919, the Norwegian painter Edvard Munch created self-portraits during his illness and after his recovery. Robyn Asleson, a curator at the National Portrait Gallery, says the American artist John Singer Sargent was painting a mural in Europe when he came down with the flu. The 62-year-old recuperated in a French military tent, which he rendered in his 1918 watercolor *The Interior of a Hospital Tent*. He wrote of "the accompaniment of groans of wounded, and the chokings and coughing of gassed men, which was a nightmare. It always seemed strange on opening one's eyes to see the level cots and the dimly lit long tent looking so calm, when one was dozing in pandemonium."

Q: Why aren't clouds affected by gravity?

Mike Ellis | Charleston, Missouri

THE WATER or ice particles that make up clouds are too small—they're measured in microns (one-thousandth of a millimeter)—to fall at any significant speed, so they can stay up in rising or turbulent air. But, says Ross Irwin, geologist and chair of the National Air and Space Museum's Center for Earth and Planetary Studies, if the clouds acquire too much moisture, then raindrops form and fall out. Clouds also tend to grow in upward-moving air. The updrafts in the atmosphere help counteract the downward velocity of the particles and keep the clouds afloat. ♦

Text by Anna Diamond

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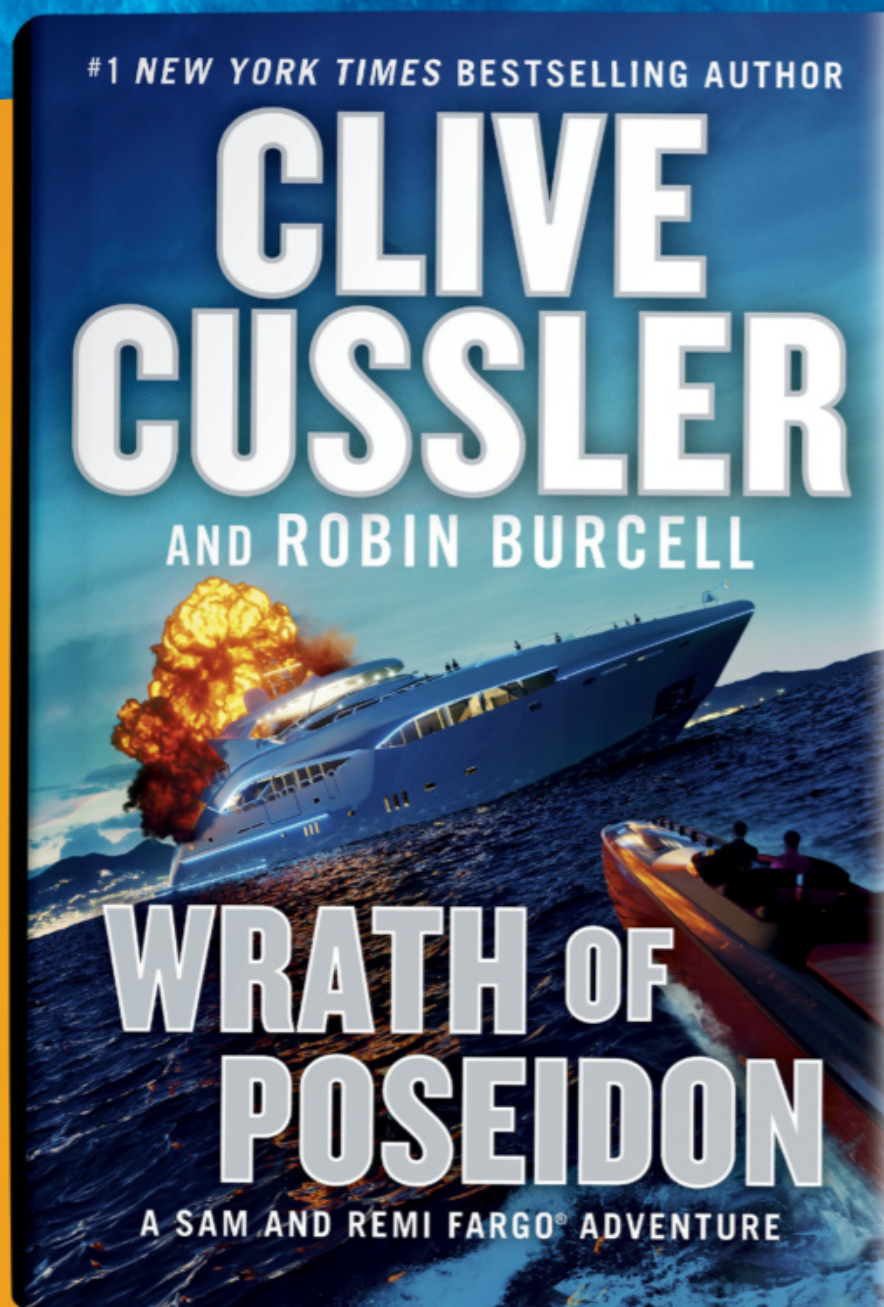
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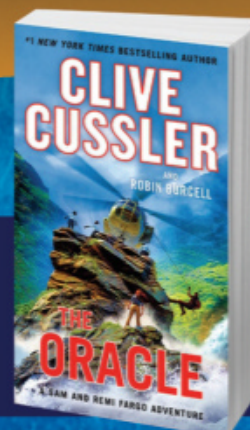
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